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ORIGINAL ARTICLES

OPEN-BITE*

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WHEN the invitation came asking me to present a paper at this meeting, I was so steeped in work that it was really impossible to undertake more. My interest in the subject of "open-bite" and the luring explanation that the members of this society are so very desirous of having me discuss it induced me to accept. It occurred to me then that the work of preparing this paper could be made somewhat easier by enlisting the cooperation of the members. To that end I thought that answers to certain questions might be of help. Several questions were then formulated and sent out to the profession. But this procedure was also intended to serve other purposes. First, I wanted to be up-to-date, because it is quite fashionable to resort to the questionnaire method of gathering information, before writing a paper. Second, I wanted to learn something, because I really know so little about the subject. Third, I wanted to rouse interest in the problem, because most orthodontists have in recent times been paying more attention to philosophy and mechanics than to the nature and significance of occlusion and malocclusion of the teeth. And last, I wanted to find out the extent and kind of reaction or response to be expected in matters of this sort, because I really never had much faith in the use of questionnaires.

The result was rather instructive. The response shown, though not very exciting, is nevertheless encouraging. Of the 127 questionnaires sent out, 33, or approximately 26 per cent, were answered. This is quite an improvement since 1915, when under a similar situation I sent out 1050 questionnaires and received 5 answers, or approximately one-half of one per cent. The in-

*Read at the Fall Meeting of the New York Society of Orthodontists, November 24, 1930, New York City.

terest shown, as may be judged from the answers received, is rather superficial, the knowledge gathered from them is very meager, and the popularity of the scheme is doubtful.

QUESTIONNAIRE

The New York Society of Orthodontists asks your cooperation to the extent of answering the following three questions. The data obtained therefrom is to be used in a paper on "Open-Bite" to be presented before the society by Dr. Milo Hellman at its first meeting on Monday, November 24, 1930. As this information is to be confidential, the signing of the card is left to your discretion.*

1. In the treatment of open-bite cases in your experience, what is the
   a—Percentage of success_____
   b—Percentage of failure_____

   Remarks:
2. How long after the removal of the appliances did you make your decision of success or failure?
3. To what do you attribute
   a—Your successes_____
   b—Your failures_____

In a general summary, it may be stated that the answers, for example, to the first question are about evenly divided between the positives and the negatives in the results. Of course, those having 50 per cent successes also have an equal percentage of failures; those having a higher percentage of successes naturally have a lower percentage of failures, and vice versa. Some are optimistic enough to claim 100 per cent success and other pessimistic enough to admit 100 per cent failure. The time when success or failure may be determined ranges from a prediction at the beginning of treatment to the convincing proof derived from the result of the case ten years after treatment was completed. The reasons for success or failure are as numerous and varied as are the individual answers. Habit is mentioned by most. In a few instances, however, the lack of knowledge is either frankly admitted or only left to be inferred. In one instance, the success of two cases is attributed to "ignoring the condition."

It is thus seen that the object aimed at was obviously defeated by the results obtained. After all is said and done, we are no further now than we were before. One feature, however, is of significance, and that is this: the percentage of both successes and failures ranges from zero to one hundred, of course depending upon how one looks at the matter; the causes to which failures and successes may be attributed are really not known, despite the fact that some sort of habit is usually blamed for failure, while certain kinds of appliances are credited for success; treatment, however, appears to have been resorted to in all instances, except in the two cases referred to above. Is there not an incongruity in the matter as a whole? Of course, the business of the orthodontist is to treat malocclusion of the teeth. But, how about the patient having a case of malocclusion known as open-bite?

To me this situation appears rather perplexing. When the questionnaire was sent out, I too made an earnest attempt to answer the questions as conscientiously as I could. It took me two whole mornings with the aid of two young ladies at the office to go through a part of my collection of

*It is hoped that the tabulation of the material gathered will not be considered a breach of confidence.

CARD NO.	ANSWER TO QUESTION 1 (A)	ANSWER TO QUESTION 1 (B)	ANSWER TO QUESTION 2	ANSWER TO QUESTION 3 (A)	ANSWER TO QUESTION 3 (B)
1*	?	high	tew months	"persistence"	"habits and wrong diagnosis"
2	approx. 50%	50%	at least 2 years	"proper diagnosis, breaking habit if present, successful mechanical treatment"	unknown causes or "dystrophy in growth"
3	50%	50%	3 to 4 years	"physical condition of patient and cooperation"	"lack of foregoing"
4	99%	1%	2 to 6 years	"treatment"	"cooperation of patient"
5	50%	50%	2 or 3 years	"Cooperation of patient in breaking habits and obeying instructions"	"lack of same"
6	50%	50%	2 months to 2 years	"correcting condition and restoring function"	"Failure to restore function through habit"
7	90%	10%	2 or 3 years	"breaking tongue habit"	failure to break habit
8	60%	40%	2 years	"early treatment"	"late treatment, loose upper lips"
9	low	high	5 to 10 years	"age"	"age"
10	40%	60%	3 years	"external appliances"	------
11	0	100%	5 years	------	------
12	100%	0	2 years	"removal of causes before or during treatment"	------
13	50%	50%	about 1 year	early treatment, cooperation	age, lack of cooperation, poor judgment in form of retention
14	¼	½	12 months or more	------	"habits of patient"
15	20%	--	3 to 4 years	"correction of contributing causes"	------
16	50%	50%	average 1 year	"growth of tissues"	"lack of growth, lack of muscular function"
17	50%	50%	6 months to 2 years	"various reasons"	"various causes"
18	in most cases	a few	2 years depending on age of patient	"cooperation in bite exercises, etc."	lack of cooperation
19	50% satis. 25% imp.	25%	about 1 year	"overcoming tongue habits"	------
20	low	high	6 months to 1 year	luck	habits
21	50%	50%	1½ to 2 years	"tissues, function of lips"	"habits and non-response of tissues"
22	75%	25%	1 year	"selection of appliance and changing same when needed"	lack of cooperation
23	50%	50%	5 to 10 years	"cured abnormal habits, muscle action"	unknown

*Numbers indicate answers on cards sent out.

TABLE—CONT'D

CARD NO.	ANSWER TO QUESTION 1		ANSWER TO QUESTION 2	ANSWER TO QUESTION 3	
	(A)	(B)		(A)	(B)
24*	50%	50%	during treatment, by response of tissues	"physical condition of patient, cause of malocclusion"	"inherited cellular growth disturbances, pathological effects"
25	75%	25% show imp.	2 to 5 years	"age of patient, perhaps"	"lack of cooperation" and unknown factors
26	same as in other types	no decided failures	a year or two, as in other cases	"gnathostatic diagnosis and slow movement"	------
27	evasive	evasive	evasive	evasive	evasive
28	100%	0	evasive	evasive	------
A†	----	--	----	"correcting tongue habit, cooperation of patient"	tongue habit, lack of cooperation
B	Wrote letter but questions were not answered.				
C	failure greater than success		----	correction of tongue habit	tongue habit, "overdevelopment of posterior region"
D	Occasional	--	----	"where bite is confined to anterior teeth" 2 cases successful by ignoring condition	"where bite is in buccal area lips are kept apart" "causes apart from mechanical, such as: glandular imbalances, muscular perversions, variations in phases and rates of growth, hereditary influences"
29	50%	50%	about 2 years	"muscle exercise"	unknown

*Numbers indicate answers on cards sent out.
†Letters indicate answers by letters.

casts and records, in order to answer the first question. Of course, the answers to the other questions took form coincidently with the examination of the material.

I was wondering how many of those who answered these questions gave up so much time, and how long it took the others to do it. It was frankly admitted by one informant that the answers were based upon mere guesses. I wonder whether it is justifiable to believe that this was the case with many of the other answers, too.

After a careful examination of my records, I found that 43 open-bite cases had come to my attention since I am in orthodontic practice. Of these, 18 were treated and 25 were not treated. Of the 18 treated cases, I obtained excellent results in 3, or 16.7 per cent of cases, fair results in 8, or 44.4 per cent of cases, some improvement, or only what I would call poor results, in 6, or 33.3 per cent of cases and not completed but referred to another orthodontist, on account of the patient leaving New York, 1, or 5.6 per cent of cases. Of the 25 untreated cases, 7 are still under observation, 4 improved without treatment and 14 I did not see again. It should be emphasized that

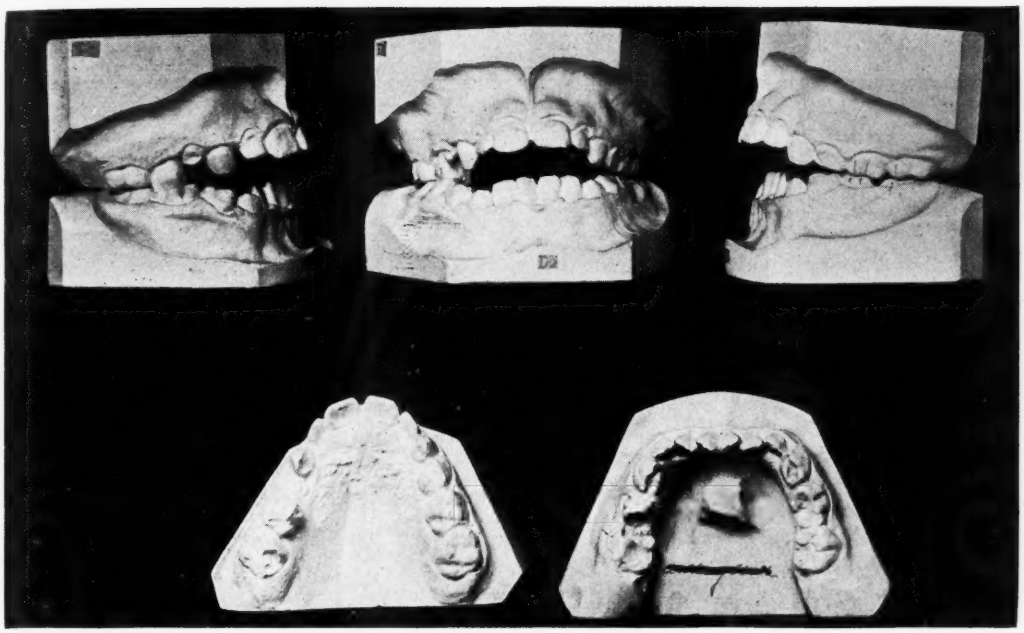

Fig. 1.—Casts of dentition of girl, age nine years, showing front, side and occlusal views of Class I case with open-bite. Note position of mandibular incisors and enamel defects at gum margin of maxillary incisor and at cusp point of maxillary right first premolar.

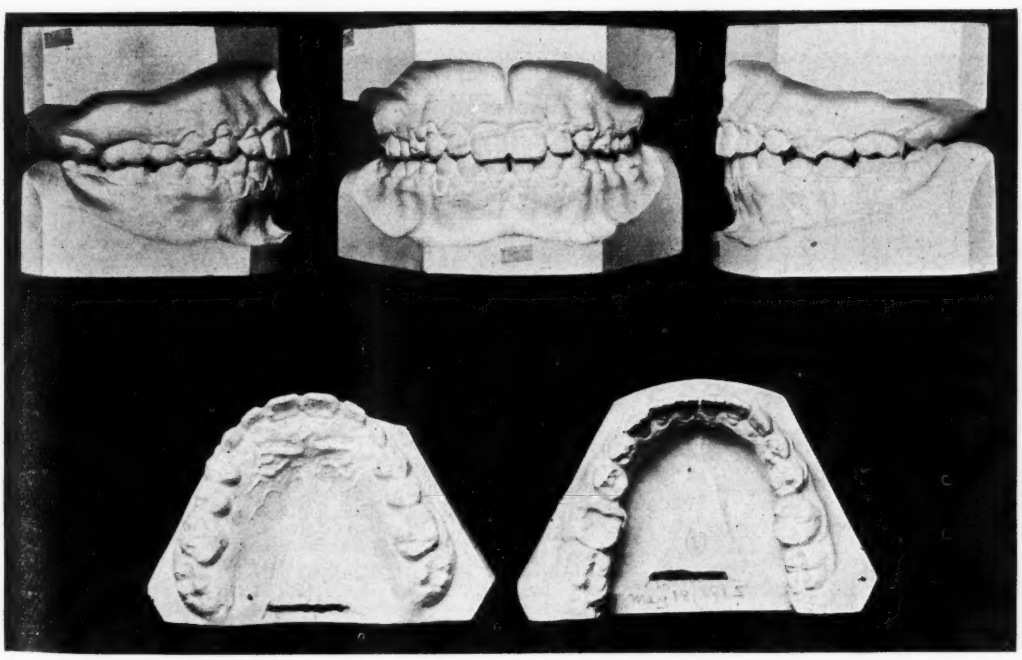

Fig. 2.—Casts of dentition of the same girl shown in Fig. 1, showing result of orthodontic treatment two and a half years later. Note change in position of mandibular incisors and enamel defect of maxillary incisors, canines and premolars, also similar defect of mandibular incisors, previously covered by gum tissues, canines and first premolars.

the 4 cases which improved without treatment are in the same proportion to those not treated as the number of excellent results to those treated, namely, 16 per cent. The accompanying illustrations give a fair idea of the

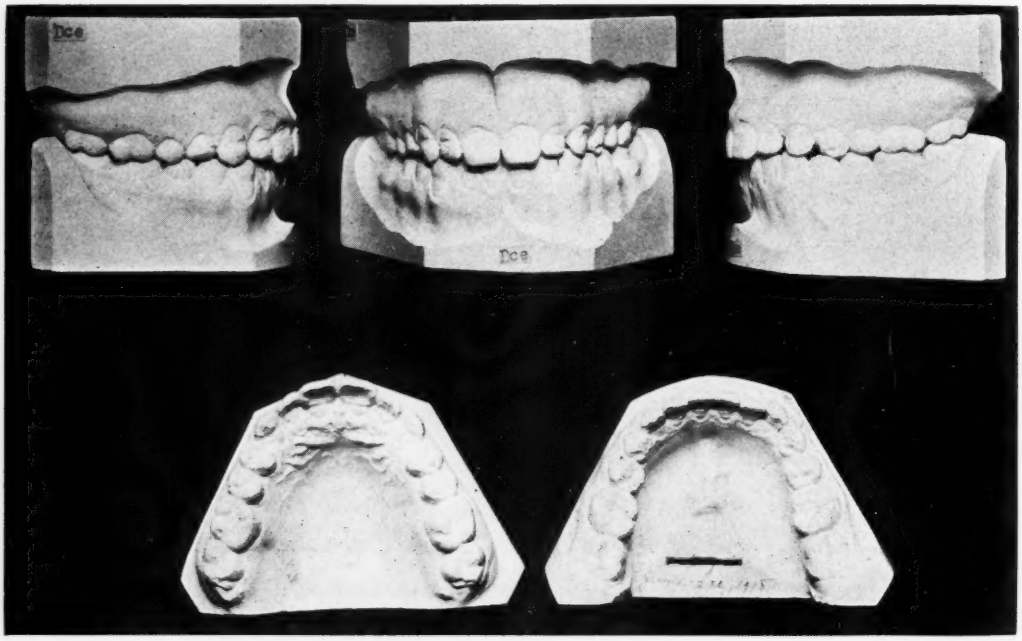

Fig. 3.—Casts of dentition of the same girl shown in Fig. 1 three years later than casts shown in Fig. 2. Note improvement in occlusion.

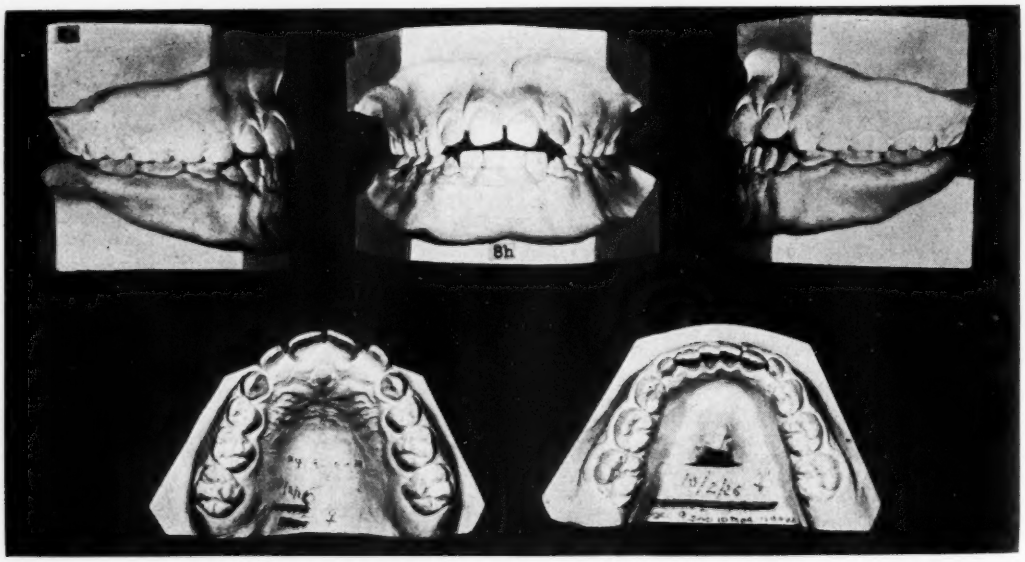

Fig. 4.—Casts of dentition of girl, nine years, ten months old, showing front, side and occlusal views of Class I case with open-bite.

excellent result obtained by treatment, as well as the extent of improvement possible without treatment. Fig. 1 thus shows one of the cases treated. It was by no means a simple matter. The patient, a girl nine years of age, had gone through many difficulties in her short life. The enamel defects on

individual teeth and the type of malocclusion of the dentition bear testimony of them. Finger-sucking was one of her habits. In Fig. 2 is shown the result obtained in two and one-half years of treatment, and in Fig. 3 is shown the state of the dentition three years after.

Fig. 4 illustrates the casts of another case of this type. The patient, also a girl, was nine years and ten months of age. She too had the habit of sucking her finger, but was broken of it five years before she came under my observation. In Fig. 5 are shown the casts of the same girl's dentition two years and one month later. The change in occlusion happened by itself without orthodontic treatment.

The fair and poor results are not illustrated now but will be described in a subsequent contribution. The time when the decision about the result of treatment was reached was one to two years after the appliances were removed.

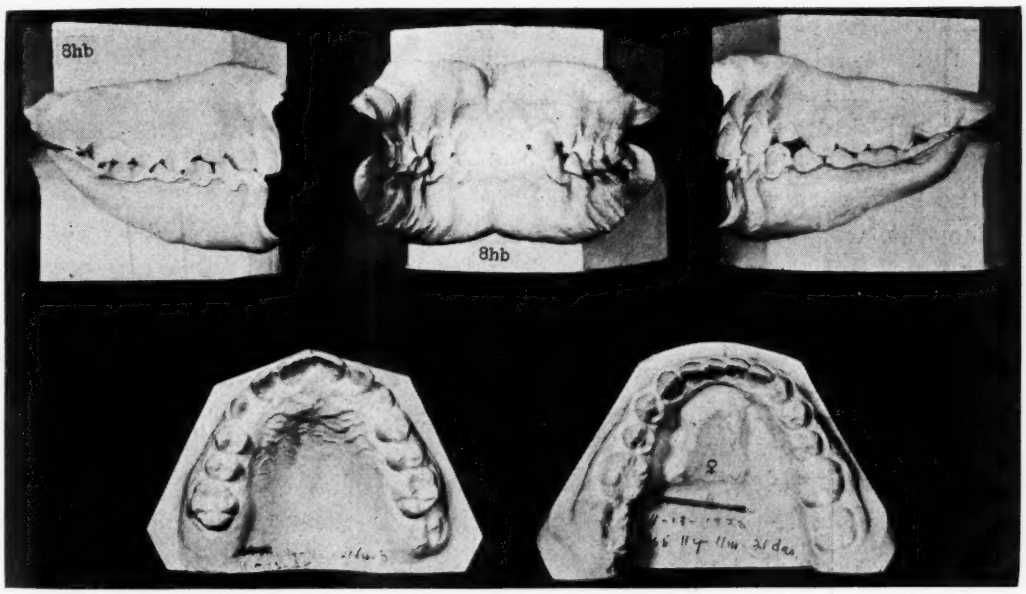

Fig. 5.—Casts of dentition of the same girl shown in Fig. 4 at eleven years and eleven months of age, showing improvement in occlusion without orthodontic aid.

In so far as the reason for success is concerned, I was until now inclined to give the credit to my knowledge, skill and dogged determination. For the failures I usually blamed the patients. I am now beginning to change my attitude in this respect. It seems to me now that there is as little certainty about the knowledge for the successful treatment of open-bite cases, as there is for their unsuccessful treatment. The reason for it is that the phenomenon represented by open-bite conditions is not so well understood. It should be mentioned at this point that there are open-bite cases belonging to Class I, Class II division 1, and Class III. The open-bite cases I refer to in this paper are those of dentitions which are in Class I malocclusion with the anterior teeth, incisors and sometimes also the canines and premolar teeth, in infra-occlusion. Fig. 1 is a typical sample of the kind I mean.

It would seem that the diagnosis of this sort of case has hitherto been

made by logical deduction. Because the anterior teeth do not meet, it is natural to suppose that there is an arrest of development in the alveolar processes bearing them, or in the bony skeleton beyond, producing the effect designated by the term infraocclusion. The remedy is just to force those teeth into their proper relation by means of orthodontic appliances. The orthodontic appliances, it was thought, supply the mechanical stimulus to bring about the necessary bone growth in the regions where it is arrested.

If the supposition of the cause is correct and the remedy appropriate, then, why so many failures? An investigation of the fundamental assumption, however, fails to prove its correctness. In the search for an explanation of what is wrong with a dentition presenting open-bite malocclusion, recourse was taken to anatomic material. For this purpose, the records of measurements of the faces of several skull collections were used. A skull collection of American negroes at the Hamann Museum, Western Reserve University in Cleveland, furnished the first clue. From this collection I picked out the measurements of the faces of 41 male skulls with the full complement of teeth in normal occlusion. The mean and standard deviation of these measurements furnished the standard for this series. There were, however, three additional skulls in this collection which also had the full complement of teeth, but whose incisors and canines were in infraocclusion. A comparison of the facial measurements of these skulls with those of the standard series, I thought, would furnish some information on this problem—which indeed they did. But the result was rather surprising, because it was unexpected. Thus, instead of finding the assumed arrest in development of the regions involved, the dimension of facial height of the skulls with the open-bite malocclusion was either within the range of the variability of the normal or even greater than the normal. This was rather puzzling. But, upon careful analysis, a ray of hope appeared. Contrary to my expectations, the trouble was located, but in a place least suspected.

If Tables I to V are carefully examined, the matter will appear somewhat more explainable. Thus, columns B and C give the average and standard deviation of the facial dimensions for the normal (41) skulls. Column D gives the dimensions of Skull No. 1141 with open-bite. If comparisons are made now, it will become quite clear that Skull No. 1141, for example, differs from the standard in several instances. Thus the total face height (Table I) is greater, exceeding even the range of variability, especially in the upper part. The height of the ramus, as determined by the condylar and coronoid heights, however, is less than the minimum in the range of variability. There are also several dimensions in width of the face (Table II) which differ from the norm. Thus the bizygomatic, bicondylar, bicanine (lower) and minimum palate are narrower, while the nasal and posterior narial widths are greater. In depth too (Table III) there are some differences. Thus the palate and mandible as a whole, as shown by the alveolar, ramus, preramus, occlusal and basal dimensions, are all smaller anteroposteriorly than in the normal. There are also differences in the facial, gonial, canine and mental angles (Table IV). The dimensions of position (Table V) are greater in the nasion and less in the prosthion inferior.

TABLE I

FACIAL DIMENSIONS OF ADULT MALE AMERICAN NEGRO SKULLS: (WRU) WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN HEIGHT. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULLS NO. 1141, NO. 1247, AND NO. 17 WITH DENTITIONS IN CLASS I OPEN-BITE MALOCCLUSION

HEIGHT	A NO.	B AVERAGE	C S.D.	D 1141 I;O	E 1247 I;O	F 17 I;O
Total Face	41	122.32	6.81	+130	+130	119
Upper Face	41	73.86	4.74	+ 79	+ 79	72
Lower Face	41	37.02	3.52	39	+ 44	34
Dental	40	15.65	1.77	15	15	16
Nasal	41	52.10	2.91	55	50	53
Subnasal	41	21.51	3.38	24	+ 29	19
Palate	41	15.20	2.01	15	+ 18	15
Post. Nares	41	28.41	2.24	30	+ 33	27
Molar Region	41	30.05	2.94	30	+ 35	− 25
Condylar	41	63.00	4.36	− 57	67	− 57
Coronoid	41	66.85	4.68	− 60	71	63
Sigmoid Notch	41	12.90	1.81	13	+ 15	13

No. = number.
S.D. = Standard Deviation.
+ = greater than range of variability.
- = less than range of variability.
I = Class I.
O = Open-bite.

TABLE II

FACIAL DIMENSIONS OF ADULT MALE AMERICAN NEGRO SKULLS (WRU) WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN WIDTH. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULLS NO. 1141, NO. 1247, AND NO. 17 WITH DENTITIONS IN CLASS I OPEN-BITE MALOCCLUSION

WIDTH	A NO.	B AVERAGE	C S.D.	D 1141 I;O	E 1247 I;O	F 17 I;O
Bizygomatic	41	132.73	4.80	−124	130	129
Bimalar	41	96.37	5.12	98	95	95
Bicanine U.	40	39.95	2.35	40	41	38
Bicanine L.	41	35.02	1.80	− 30	36	+ 37
Alv. Arch U.	41	68.90	3.98	67	+ 74	64
Alv. Arch L.	41	70.98	2.80	71	73	73
Nasal	41	27.39	1.94	+ 31	29	27
Post. Nares	41	33.17	2.43	+ 36	32	− 30
Interorbital	40	26.33	2.22	25	26	− 24
Palate (Max.)	35	42.43	3.77	39	46	39
Palate (Min.)	41	25.49	3.04	− 21	27	23
Bicondylar	40	117.23	5.37	−110	119	112
Bigonial	40	99.10	6.27	97	100	102

No. = number.
S.D. = Standard Deviation.
+ = greater than range of variability.
- = less than range of variability.
U. = upper.
L. = lower.
Alv. = alveolar.
I = Class I.
O = Open-bite.

TABLE III

FACIAL DIMENSIONS OF ADULT MALE AMERICAN NEGRO SKULLS (WRU) WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN DEPTH (ANTEROPOSTERIOR DIMENSIONS). COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULLS NO. 1141, NO. 1247, AND NO. 17 WITH DENTITIONS IN CLASS I OPEN-BITE MALOCCLUSION

DEPTH	A NO.	B AVERAGE	C S.D.	D 1141 I;O	E 1247 I;O	F 17 I;O
Total Palate	41	51.22	3.32	-45	+60	48
Anterior Palate	41	39.88	3.07	40	+47	40
Posterior Palate	41	11.34	2.91	- 5	13	- 8
Alv. Ramus	41	90.56	5.18	-83	97	-82
Pre Ramus	40	54.00	3.74	52	+58	53
Ramus	41	35.90	3.10	-31	38	-30
Occlusal	41	92.85	5.34	-85	+99	-83
Basal	41	82.85	4.91	-76	82	-73
Alv. Arch Upper	41	53.85	3.19	56	+58	52
Alv. Arch Lower	41	55.66	3.21	53	+60	53
Condylar Coronoid	41	34.10	4.29	34	32	-27

No. = number.
S.D. = Standard Deviation.
+ = greater than range of variability.
- = less than range of variability.
Alv. = alveolar.
I = Class I.
O = Open-bite.

TABLE IV

FACIAL DIMENSIONS OF ADULT MALE AMERICAN NEGRO SKULLS (WRU) WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN FACE ANGLES. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULLS NO. 1141, NO. 1247, AND NO. 17 WITH DENTITIONS IN CLASS I OPEN-BITE MALOCCLUSION

ANGLE	A NO.	B AVERAGE	C S.D.	D 1141 I;O	E 1247 I;O	F 17 I;O
Facial	40	81.38	3.47	+ 88	- 78	79
Alveolar	40	57.88	5.82	62	57	- 43
Gonial	41	118.78	6.12	+127	120	124
Mental	40	71.50	6.21	- 64	74	72
Canine	40	74.75	4.55	+ 82	- 69	70

TABLE V

FACIAL DIMENSIONS OF ADULT MALE AMERICAN NEGRO SKULLS (WRU) WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN FACE POSITIONS. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULLS NO. 1141, NO. 1247, AND NO. 17 WITH DENTITIONS IN CLASS I OPEN-BITE MALOCCLUSION

POSITION	A NO.	B AVERAGE	C S.D.	D 1141 I;O	E 1247 I;O	F 17 I;O
Aur. Nasion	41	92.24	4.68	+ 97	91	- 84
Aur. Pros. S.	41	104.76	4.77	102	+111	- 95
Aur. Pros. In.	41	111.02	4.83	-106	+116	-105
Aur. Menton	41	122.49	4.64	120	124	-114

No. = number.
S.D. = Standard Deviation.
Aur. = Auriculo.
Pros. S. = Prosthion Superior.
Pros. In. = Prosthion Inferior.
I = Class I.
O = Open-bite.
+ = greater than range of variability.
- = less than range of variability.

Of the differences mentioned, it would seem that those of greatest significance are associated with height and depth and their effect upon the position of the face. If a diagram is constructed from several combinations of the most important of these measurements, it will be seen at a glance what parts contribute most to this form of malocclusion. Fig. 6 was constructed from the combined measurements of total face, upper face, lower face, dental and ramus heights in combination with basal mandibular depth and the measurements of facial positions. This figure thus presents a diagrammatic outline of the facial profile. The shaded area is the standard and represents the average and standard deviation of these dimensions of skulls with normal occlusion. The middle line in this figure is the average, and the end lines are the minimum and maximum of the standard deviation. The solid

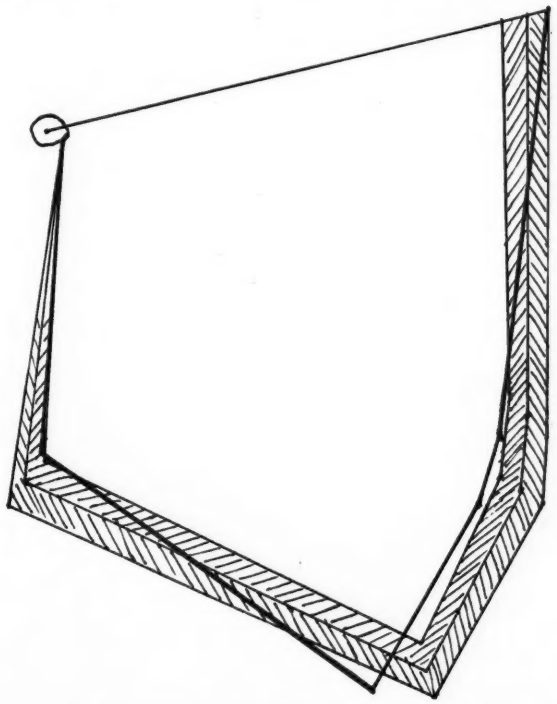

Fig. 6.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of facial dimensions of 41 adult American negro skulls (W.R.U.) and of male skull No. 1141 (solid heavy line) with dentition in Class I open-bite malocclusion.

heavy line represents and superposes the facial profile of the skull with the dentition in open-bite malocclusion. It will be noted at once that, while the face as a whole is longer in the skull with malocclusion, the ramus and body of the mandible are shorter. This, of course, also contributes to a more obtuse mandibular (gonial) angle than in the normal.

This illustration demonstrates the fact that the open-bite in this dentition may be due to or is associated with arrested growth, but not in the front part of the face where the disturbance in occlusion occurs, but rather in the back part of the mandible and in the ramus. Two other skulls (No. 1247 and No. 17) had dentitions with open-bites. Tables I to V, columns E and F, show that they too differ from the norm. But, while the differences are not quite like those in Skull No. 1141, the effect upon the occlusion appears to be the same.

The comparisons shown in Fig. 7 are of interest, because the manner in which the skulls with the open-bite dentitions differ from the standard is unlike that in Fig. 6. Thus, the shaded area again represents the range of variability of the facial profile of the skulls with normal occlusion. Superposed upon it are two skulls resembling each other in that they both have open-bite dentitions. They differ from each other, however, in every other respect. Thus the facial profile of Skull No. 17, indicated by the letter A, is vertically equal to the standard except the ramus height which is shorter. Anteroposteriorly, however, face A falls inside of the dimensions for the standard. In this instance the ramus is shorter than the standard, but it is relatively not as short as that in Fig. 6. But the dimension of the body of the

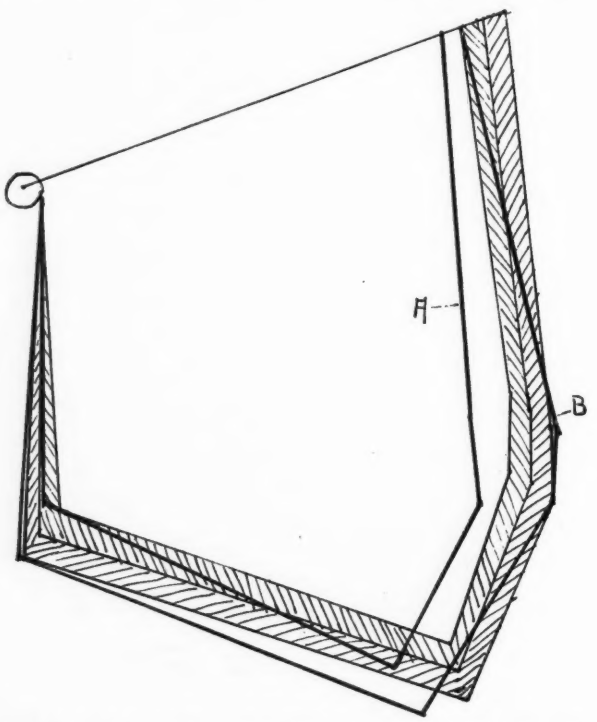

Fig. 7.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of facial dimensions of 41 adult American negro skulls (W.R.U.) and of male skulls No. 17 (heavy solid line A) and No. 1247 (heavy solid line B) with Class I open-bite malocclusion.

mandible is considerably shorter. The case is just reversed in the face of Skull No. 1247, indicated by letter B in Fig. 7. As may be noted in Tables I to V, the ramus height and anteroposterior dimension of the body of the mandible do not fall outside the limits of the range of variability, but five out of seven of the other dimensions used in the construction of this diagram exceed those for the standard very considerably. The relationship of ramus height and mandibular depth to open-bite are consequently the same in kind but different in degree.

Another series of skulls was then used as a check on this matter. For this purpose, a standard was worked out from the average and standard deviation of the measurements of 25 male skulls of European whites from Hungary. These skulls belong to the von Luschan collection at the American Museum

TABLE VI

FACIAL DIMENSIONS OF ADULT MALE EUROPEAN WHITE SKULLS FROM SZARAZD, HUNGARY (AMNH v.L.), WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN HEIGHT. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULL NO. 4906 WITH CLASS I OPEN-BITE AND OF SKULL NO. 4375 WITH CLASS I EXCESSIVE OVERBITE

HEIGHT	A NO.	B AVERAGE	C S.D.	D 4906 I;O	E 4375 I;++
Total Face	25	111.76	5.55	116	–103
Upper Face	25	68.00	4.06	67	67
Lower Face	25	30.92	2.24	32	29
Dental	25	13.76	2.04	+ 18	– 9
Nasal	25	49.44	3.11	47	50
Subnasal	25	18.56	2.61	20	17
Palate	22	13.27	2.03	+ 16	– 9
Post. Nares	23	28.17	2.85	– 23	+ 35
Molar Region	25	26.60	2.68	26	27
Condylar	22	62.00	3.75	– 55	+ 69
Coronoid	22	62.32	4.52	59	+ 67
Sigmoid Notch	23	12.74	2.13	+ 15	11

No. = number.
S.D. = Standard Deviation.
+ = greater than range of variability.
- = less than range of variability.
I = Class I.
O = Open-bite.
+ + = excessive overbite.

TABLE VII

FACIAL DIMENSIONS OF ADULT MALE EUROPEAN WHITE SKULLS FROM SZARAZD, HUNGARY (AMNH v.L.), WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN WIDTH. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULL NO. 4906 WITH CLASS I OPEN-BITE AND OF SKULL NO. 4375 WITH CLASS I EXCESSIVE OVERBITE

WIDTH	A NO.	B AVERAGE	C S.D.	D 4906 I;O	E 4375 I;++
Bizygomatic	25	129.16	5.74	–119	128
Bimalar	25	92.32	5.72	– 82	98
Bicanine U.	25	37.92	2.30	36	+ 41
Bicanine L.	25	33.48	1.94	– 31	34
M. Alv. Arch. U.	25	60.04	3.67	57	+ 65
M. Alv. Arch L.	25	65.12	4.74	– 57	61
Nasal	25	24.84	1.64	– 23	25
Post. Nares	23	30.61	2.82	– 26	31
Interorbital	24	24.08	1.96	– 22	25
Palate (Max.)	25	40.12	3.41	37	41
Palate (Min.)	25	24.76	1.79	23	26
Bicondylar	23	118.26	7.41	–100	119
Bigonial	25	100.20	8.52	93	98

No. = number.
S.D. = Standard Deviation.
+ = greater than range of variability.
- = less than range of variability.
M. = maximum.
Alv. = alveolar.
U. = upper.
L. = lower.
I = Class I.
O = Open-bite.
+ + = excessive overbite.

TABLE VIII

FACIAL DIMENSIONS OF ADULT MALE EUROPEAN WHITE SKULLS FROM SZARAZD, HUNGARY (AMNH v.L.), WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN DEPTH (ANTEROPOSTERIOR DIMENSIONS). COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULL NO. 4906 WITH CLASS I OPEN-BITE AND OF SKULL NO. 4375 WITH CLASS I EXCESSIVE OVERBITE

DEPTH	A NO.	B AVERAGE	C S.D.	D 4906 I;O	E 4375 I;++
Total Palate	23	46.61	2.35	45	48
Anterior Palate	24	35.63	2.75	–31	35
Posterior Palate	23	11.13	1.82	+14	+13
Alv. Ramus	25	76.04	3.51	–71	73
Pre Ramus	24	46.54	2.68	46	–43
Ramus	24	28.92	2.04	–25	+31
Occlusal	21	77.19	4.19	75	75
Basal	24	71.46	4.51	–61	68
Alv. Arch Upper	25	45.88	3.85	47	51
Alv. Arch Lower	24	44.25	5.64	40	41
Condylar Coronoid	23	32.96	4.22	29	36

No. = number.
S.D. = Standard Deviation.
+ = greater than range of variability.
- = less than range of variability.
Alv. = alveolar.
I = Class I.
O = Open-bite.
+ + = excessive overbite.
Aver. = average.

TABLE IX

FACIAL DIMENSIONS OF ADULT MALE EUROPEAN WHITE SKULLS FROM SZARAZD, HUNGARY (AMNH v.L.), WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN FACE ANGLES. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULL NO. 4906 WITH CLASS I OPEN-BITE AND OF SKULL NO. 4375 WITH CLASS I EXCESSIVE OVERBITE

ANGLE	A NO.	B AVERAGE	C S.D.	D 4906 I;O	E 4375 I;++
Facial	25	87.16	2.92	90	–83
Alveolar	25	71.36	7.26	70	+80
Gonial	22	121.00	5.85	125	–111
Mental	24	60.75	7.83	+ 71	+ 72
Canine	24	78.87	5.43	82	+ 85

of Natural History. Skull No. 4906 had a dentition in Class I open-bite malocclusion. Comparisons of the dimensions of this skull (column D) with the standard (columns B and C) in Tables VI to X show differences resembling those of the previous series. Thus in this instance the most significant differences are also found in the dimensions of the ramus and body of the mandible. As is shown in Fig. 8, similarly worked out from the dimensions in question, the short ramus and the body of the mandible are again brought into relationship with the open-bite condition.

That the short ramus and short body of the mandible are causally related to open-bite cases may also be shown by negative evidence. Skull No. 4375 had a dentition in Class I malocclusion, but the incisors and canines were in an excessive overbite relationship. It will be noted in Tables VI to X (column E) that the difference in the dimensions of this face tend to be of an opposite nature to those in the skull with open-bite (column D). In Fig. 9

TABLE X

FACIAL DIMENSIONS OF ADULT MALE EUROPEAN WHITE SKULLS FROM SZARAZD, HUNGARY (AMNH v.L.), WITH DENTITIONS IN NORMAL OCCLUSION, SHOWING THE AVERAGE WITH ITS STANDARD DEVIATION OF THE DIFFERENT DIMENSIONS IN FACE POSITIONS. COMPARED WITH THE SERIES ARE THE FACIAL DIMENSIONS OF SKULL No. 4906 WITH CLASS I OPEN-BITE AND OF SKULL No. 4375 WITH CLASS I EXCESSIVE OVERBITE

POSITION	A NO.	B AVERAGE	C S.D.	D 4906 I;O	E 4375 I;++
Aur. Nasion	25	87.92	3.46	89	85
Aur. Pros. S.	25	93.72	4.04	- 88	97
Aur. Pros. In.	25	99.44	3.71	97	97
Aur. Menton	25	113.16	5.13	–107	112

No. = number.
S.D. = Standard Deviation.
Aur. = Auriculo.
Pros. S. = Prosthion Superior.
Pros. In. = Prosthion Inferior.
I = Class I.
O = Open-bite.
+ + = excessive overbite.
+ = greater than range of variability.
- = less than range of variability.

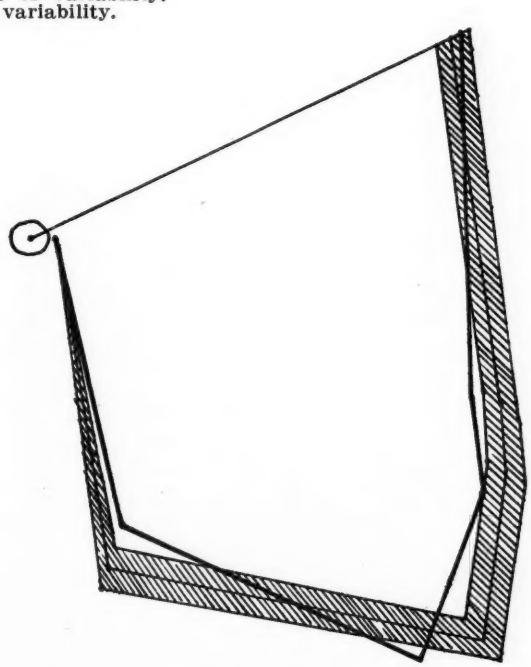

Fig. 8.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of facial dimensions of 25 adult white male skulls from Szarazd, Hungary (von Luschan collection at the American Museum of Natural History) with dentitions in normal occlusion and of male skull No. 4906 v.L. (solid heavy line) with Class I open-bite malocclusion.

too, representing the dimensions of Skull No. 4375, it will be seen that, despite the fact that the total face height is shorter, the ramus height is greater than the standard. The effect upon the bite is consequently reversed. Thus the evidence derived from anatomy tends to support the observed fact that faces with dentitions in open-bite malocclusion are associated with and may be causally related to an absolutely or relatively short ramus and a short body of the mandible.

But what about the cases coming to the orthodontist for treatment? If a similar method of procedure is adopted for recording cases of malocclusion

as that pursued in measuring skulls, data are available for comparisons of a like nature. In the last six years I adopted such procedure as routine practice. With the accumulation of sufficient records it has now become possible for me to construct similar standards by which cases of malocclusion are appraised. Of course, these standards are not as simple as those applied to the anatomic material mentioned, because in practice we are dealing with individuals in their making, while the skulls referred to were those of adults. Thus, in growing individuals it is necessary to construct standards in accord with stages of development. Since orthodontists are dealing with the dentition, it is necessary to take the dentition as the criterion and to use it as a basis for the different stages attained in the course of its development. An account of these stages was given in several contributions (see References) and will not be repeated now. Suffice it to say that in comparisons made of

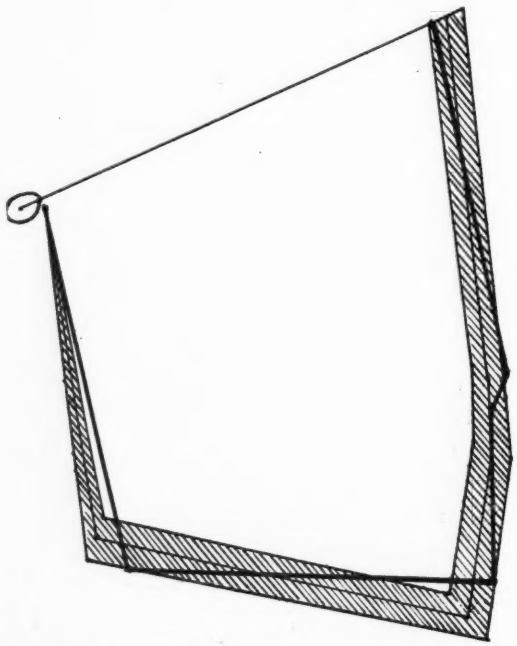

Fig. 9.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of facial dimensions of 25 adult white male skulls from Szarazd, Hungary (von Luschan collection at AMNH) with dentitions in normal occlusion and of male skull No. 4375 v.L. with Class I excessive overbite malocclusion.

cases of certain individuals the standard used is that of the developmental group to which the patient belongs. Thus, Case 1 is of a girl belonging to a developmental level designated as Stage III B. The standard used was obtained from 159 series of face measurements on girls at this stage of development. In Table XI the measurements of this girl's face are compared with the average and standard deviation for the group. The outstanding differences appear in the total face height, which is greater in the girl than in the group. This is also the case in the lower face height, the shorter body of the mandible and the ramus which approximates the minimum in the range of variability. A diagram constructed from these measurements will illustrate the effect of these differences. Thus, in Fig. 10 is illustrated the diagram of the facial profile worked out from the respec-

tive dimensions. The shaded area represents the average and standard deviation of the group and the solid heavy line the facial profile of the girl with the open-bite dentition. Note again the absolute and relative difference between the height of the ramus and that of the face. Of course, the mandibular depth gonio-menton too is considerably less than that of the group. This again points to the fact that a short ramus and body of the mandible are features appearing in relationship with open-bite malocclusion, also in the patient of the orthodontist.

This fact and the probability that this relationship may prove to be one of cause and effect can also be supported by evidence of a different sort. The proof thus far mentioned refers mainly to the difference in size of the particular elements in question. In the adult the parts which have been arrested in their development have reached their limit and do not increase in size any

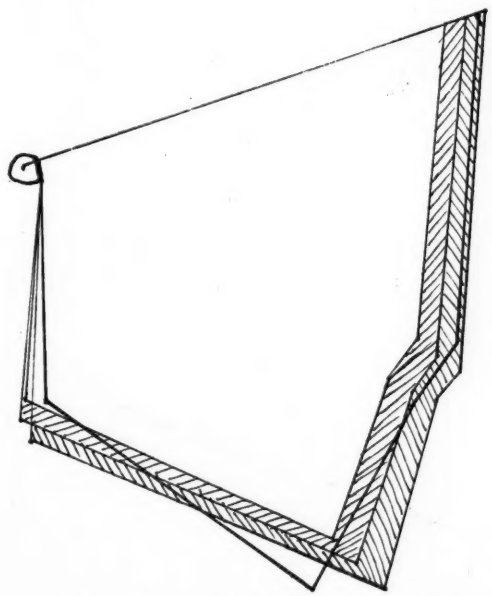

Fig. 10.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of 159 series of facial dimensions of girls with all kinds of occlusion and of one girl (solid heavy line) eleven years eight months old with Class I open-bite malocclusion. Age of group = 10.52 ± 1.37.

more. When the growing individual is taken into account, the matter is not definitely settled. Growth in developing individuals may not be permanently arrested, but just temporarily retarded. Some growth taking place subsequently may bring about a change in the entire situation. For example, Case 2, a boy eleven years of age, has a dentition in Class I malocclusion with open-bite. A comparison of this boy's facial profile with that of the group for his stage of development, Fig. 11, shows that, despite the fact that his face is larger than the group, the ramus is absolutely and relatively undersized. However, if the measurements of the face for three consecutive years are compared, and diagrammatically represented, they will show that some very significant changes have taken place. Thus, from Fig. 12, showing growth increments at ten, eleven and twelve years of age, it is plainly evident that, while the entire face had increased comparatively little in size

from ten to eleven years (1-2), it has increased considerably during the year after (2-3). But, at the same time the ramus and body of the mandible in-

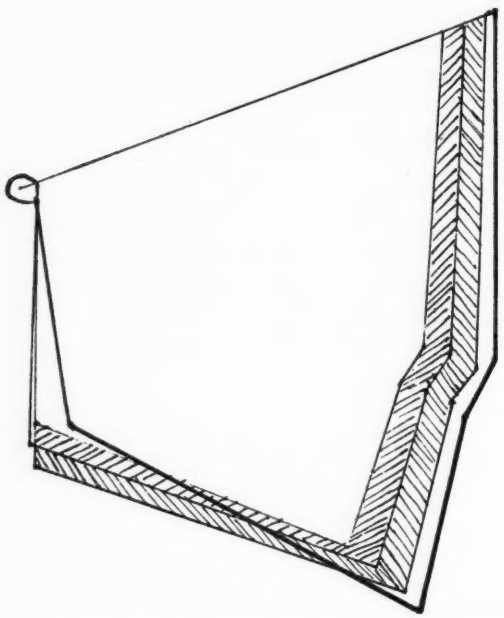

Fig. 11.—Diagram of facial profile, showing comparison between the average and its standard deviation (shaded area) of 114 series of facial dimensions of boys with all kinds of occlusion and of one boy (solid heavy line) ten years of age with Class I open-bite malocclusion. Age of group = 9.00 ± 1.41.

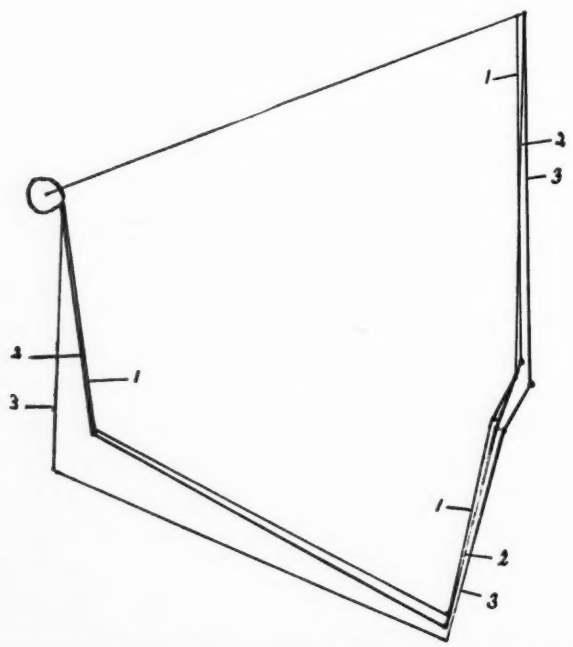

Fig. 12.—Diagrams of facial profile of boy with Class I open-bite malocclusion, showing growth changes at ten (1), eleven (2) and twelve (3) years of age.

creased in size absolutely and relatively more than any other part of the face. A comparison at this age (twelve) of his face with that of the group, Fig. 13, gives a different aspect of the situation. Compare this with Fig. 11.

But the interesting feature is that, coincident with this change in growth of the ramus and mandible, there has been an improvement in the occlusion of the teeth. The bite, while not entirely corrected, has closed up a good deal. The final outcome of this case is not as yet known. It is still under observation. This occurrence, it should be understood, is not exceptional. It has been observed also in other instances.

Thus, Lewis in his researches on deciduous dentitions has found that "Occlusion is affected by growth changes and by factors influencing growth." In following up open-bite cases in deciduous dentitions he has observed that under favorable circumstances they tend to improve. For instance: "In thumb-sucking cases," says Lewis, "where the habit has not been broken, the resultant malocclusion remains practically static. When the habit has

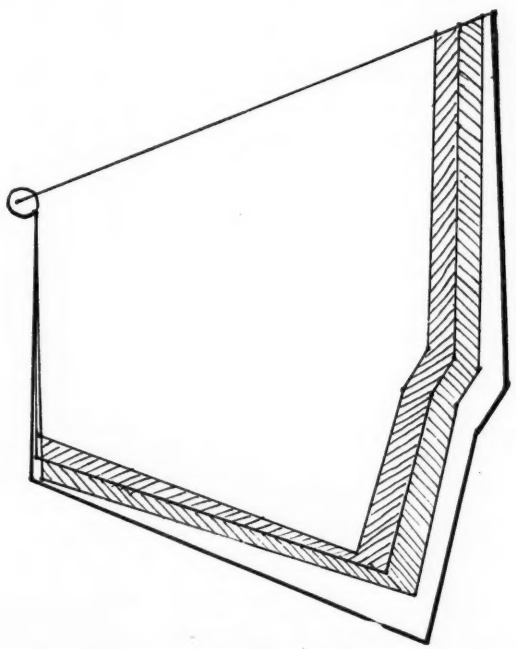

Fig. 13.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of 114 series of facial dimensions of boys with all kinds of occlusion and of the same boy shown in Fig. 11 (solid heavy line) with Class I open-bite malocclusion two years later.

been broken before the fifth year, the resultant malocclusion has a tendency to correct itself." How long after the breaking of the habit will the improvement be noticeable? Lewis is not so sure, but he observed that 10 out of 30 cases improved after the breaking of the habit. In the case shown in Fig. 4 the thumb-sucking habit was broken at five years of age. When the casts shown in the illustration were made, the patient was ten years old. It was during the two years between ten and twelve when the occlusion in this case corrected itself (see Fig. 5). This case is cited to direct the attention to the fact that in this instance at least five years elapsed after the breaking of the habit and the beginning of the improvement in the occlusion. It would seem as though the increase in the size of the ramus was necessary in addition to the breaking of the habit.

TABLE XI

DIMENSIONS OF HEAD AND FACE, SHOWING RESEMBLANCES AND DIFFERENCES BETWEEN THE AVERAGE WITH ITS STANDARD DEVIATION OF THE GROUP WITH ALL SORTS OF OCCLUSION AND OF ONE GIRL (S.K.) WITH CLASS I OPEN-BITE MALOCCLUSION

HEIGHT	NO.	AVERAGE	S.D.	S.K. I;O
Auricular	159	128.13	4.74	132
Total Face	159	103.04	5.76	+111
Upper Face	158	62.45	4.08	66
Lower Face	158	33.16	2.53	+ 38
Dental	158	7.37	2.20	+ 12
Nasal	144	46.12	3.18	+ 51
Ramus	49	44.18	3.94	41
WIDTH				
Maximum Head	159	142.51	4.95	145
Minimum Frontal	158	101.77	4.38	105
Bizygomatic	158	123.25	5.52	127
Bicondylar	158	117.37	5.25	120
Bigonial	159	89.87	5.67	92
Nasal	144	29.44	2.27	28
DEPTH (ANT.-POST.)				
Head Length	158	179.40	6.09	181
Auriculo-Nasion	158	87.49	3.93	90
Auriculo-Pros. S.	158	85.47	4.83	88
Auriculo-Pros. In.	136	84.11	4.92	85
Auriculo-Menton	158	96.79	6.78	95
Gonio-Menton	106	81.49	5.31	–76
GENERAL				
Age	154	10.52	1.37	11 yr. 8 mo.
Stature	158	56.62	3.81	60¾
Weight	155	77.26	13.20	94

No. = number.
S.D. = Standard Deviation.
Pros. = Prosthion.
+ = greater than range of variability.
- = less than range of variability.
Ant.-Post. - antero-posterior.
I = Class I.
O = Open-bite.
In. = Inferior.
S. = Superior.

In some cases where growth changes exceed the normal limits, occlusal disturbances may change from one extreme to the other. Thus, the open-bite of a case, under such circumstances, may not only just close up, but do that to excess. For example, in Case 3, a girl eight years nine months of age, the dentition was in Class I open-bite. A comparison of her facial diagram with that of the same developmental group, as may be seen in Fig. 14, shows the size of her face well within the range of variability. But here again the ramus is shorter. In Fig. 15 are shown the diagrams of the girl's face at the above age and two years later. The modification of the face brought about by the growth changes during these two years is seen at a glance. While the anterior parts of the face have not increased their vertical dimensions at all, the ramus and the body of the mandible have grown considerably. The effect on the position of the face is remarkable and quite obvious, the entire face having migrated anteriorly. The occlusion too has undergone a change. The posterior teeth remained in the same occlusion, but the incisor relationship has changed from an open-bite to an excessive overbite. A comparison of the dimensions of her face with those of the

group at this age (eleven) shows an entirely different picture (Fig. 15). The ramus approximates that of the average, while the prosthion superior and inferior have come more closely together than even in the entire group, showing that the original situation is now really reversed.

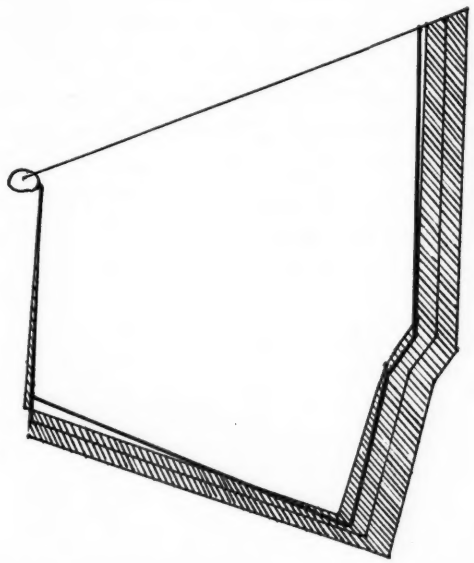

Fig. 14.—Diagram of facial profile, showing comparison between the average with its standard deviation (shaded area) of 106 series of facial dimensions of girls with all kinds of occlusion and of one girl (solid heavy line), eight years nine months old, with Class I open-bite malocclusion. Age of group = 8.40 ± 1.14.

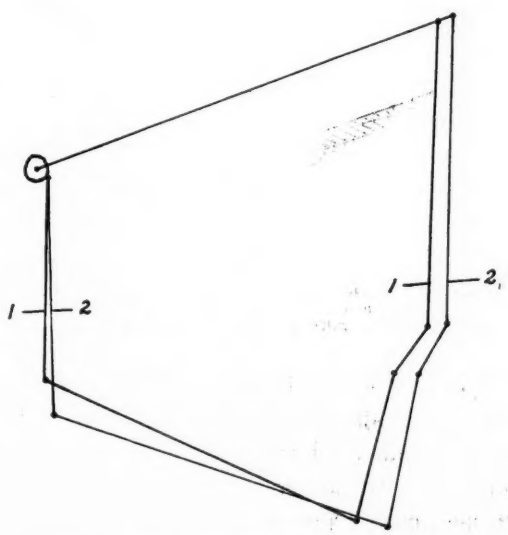

Fig. 15.—Diagram of facial profile of girl with Class I malocclusion, showing growth changes and their effect upon occlusion. At nine years (1) the dentition was in Class I open-bite; at eleven years (2) the dentition changed from open-bite to excessive overbite.

From the evidence cited, the mechanism of open-bite conditions appears to be rather simple. If two horizontal surfaces, for example, are held parallel to each other by a joint set off by a vertical extension at an angle to them, other things being equal, the shorter the extension the greater the liability of the opposite ends to remain more apart, and vice versa. The

midpoint where the deviation may occur would be the fulcrum. In the dentition the alveolar processes are the horizontal surfaces, the teeth keeping them approximately parallel. The ramus is the vertical extension to the joint; somewhere on the occlusal surfaces there is the fulcrum. Shorten the ramus, leaving everything else alone, and the teeth in front will open. Lengthen the ramus and the teeth in front will overlap too much. Of course, growth and adaptation are to be accounted for. That is why these cases are not so frequent; but where growth is deficient the result is inevitable.

Now, what about the outcome of treatment in open-bite cases: Or, to put it into technical form, what is the prognosis of such cases? If the natural growth changes of the ramus and body of the mandible could be controlled, the prognosis would be excellent. All one would have to do would be to dispatch a few growth-promoting hormones, vitamins or ultraviolet

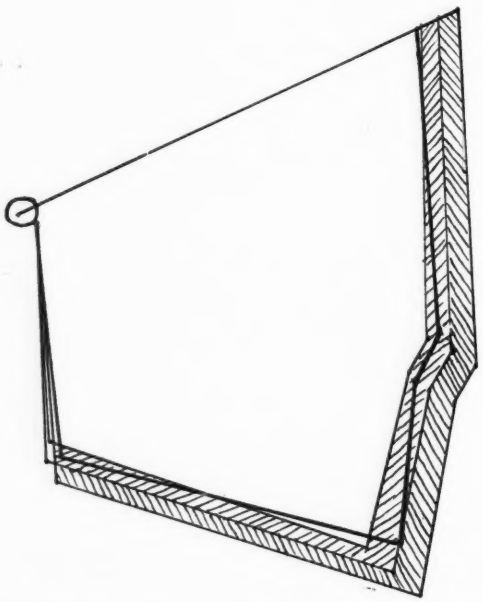

Fig. 16.—Diagram of facial profile, showing comparison between the average and its standard deviation (shaded area) of 159 series of facial dimensions of girls with all kinds of occlusion and of the same girl shown in Fig. 14 (solid heavy line) now with Class I excessive overbite at the age of eleven years. Age of group = 10.52 ± 1.37.

rays and the result would be accomplished. But, while much is known about these agents, nothing as yet specifically can be done with them. In extreme cases surgery perhaps stands a chance. I do not know much about it and would not recommend it. Orthodontia? From the orthodontic viewpoint the prognosis is not so good. The results obtained by the trial and error method are certainly not encouraging. According to the answers received, the informants do not seem to be so very enthusiastic about them. From my own experiences the percentage of excellent results is equal to that obtained by leaving well enough alone. I am now beginning to question whether those results were obtained because of the treatment or in spite of it. As to the poorer results, they show the perplexity of the situation. Here we come to the crossroads. Which one are we to follow? It would seem that growth is the predominating factor in the establishment of occlusion, as it

is in the development of the entire individual. But growth is not constant and definite. It varies in intensity, it varies in time, it varies in direction, and it varies in different structures and in different parts of the same structure. An adequate knowledge of growth is therefore indispensable. But growth cannot be controlled. It is therefore also necessary to recognize our limitations.

In the consideration of open-bite or other type cases, for that matter, it is necessary to take into account the problem as a whole. The orthodontist has yet to learn the fact that treatment of any case is not indicated just because the patient comes into his office. The stage of development of the individual as a whole and particularly that of the face, jaws and dentition has to be taken into account. Moreover, the prospective patient in question has to be taken into account. Has growth at the time the patient comes to the orthodontist reached its limit in the unfolding of the individual, or are there further changes yet to be expected in the course of time? One examination will not determine it. From many periodic examinations over a long stretch of time, a good deal more can be learned about it. The orthodontist has been under the impression that appliances stimulate growth. He has never given a thought to the possibility that appliances may at times also hinder it. After having given the natural processes the benefit of the doubt and a chance to overcome certain difficulties, it is of importance for the orthodontist to take into consideration also his own limitations. Then, by comparing the chances of a case for a successful result with those for an unsuccessful result, the matter can be put fairly and squarely up to the patient. Of course, one is reminded at this point of the attitude of the surgeon who, knowing that a certain operation is fatal in 99 cases out of 100, still will undertake to do it, because of the possibility that his may be the 100th. Well, the orthodontist's chances for success in the treatment of open-bite cases seem to be sixteen times as great. But the eighty-four chances against him should at the same time not be forgotten.

SUMMARY

In summing up the main points of interest in this paper, it should be stated that:

1. As a means of discovering facts on open-bite malocclusion, the questionnaire method cannot be taken seriously.

2. Those answering the questions do not, as a rule, take the necessary trouble entailed in such an undertaking.

3. A careful examination of records of open-bite cases revealed the fact that the percentage of good results of those treated is equal to the percentage of those which improved without treatment.

4. The reason for success or failure in treatment is not known. The habit of finger-sucking and breaking of the habit may be part of the problem.

5. The study of skeletal material revealed the fact that the occlusal disturbance known as open-bite is in constant relationship with an absolutely or relatively short ramus and body of the mandible and not with an arrest of development in the incisor region.

6. This relationship is also found in cases with open-bite coming to the orthodontist for treatment.

7. In the course of individual development the short ramus and mandible may increase in size by the natural process of growth.

8. Coincidently with the growth increments in the mandible the open-bite condition often improves.

9. When growth changes are favorable, the prognosis of open-bite cases is excellent and may require no orthodontic treatment; when unfavorable, the outcome of treatment is questionable.

10. To determine the chances of a favorable outcome against those of an unfavorable one, an adequate knowledge of development, as it concerns the face, jaws and dentition, is essential.

11. To gain such knowledge the method of diagnosing cases of malocclusion must rest upon a recognition of many other factors besides the occlusion of the teeth. These are the stage of development of the patient and the changes in the face, jaws and dentition yet to take place during further development. The fact to be recognized is that, with increase in size, change in proportion and alteration in position of the face, there is also an accompanying effect which tends to modify the occlusion of the teeth. Upon the appraisal of this effect, then, will depend the diagnosis and prognosis of the case.

Grateful acknowledgment is herewith made to the American Museum of Natural History and to the Hamann Museum, Western Reserve University, for the help and courtesies shown in permitting the study of their valuable collection of skulls.

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TEN YEARS IN THE NEW YORK SOCIETY OF ORTHODONTISTS

President's Address*

By William C. Fisher, New York City

THE New York Society of Orthodontists celebrates its tenth anniversary, and your president has served eight of those ten years as secretary-treasurer. I know of no labor in my profession that has given me more pleasure and a satisfied feeling of, I hope, work well done.

That handful of men who a little over ten years ago decided that such a Society was needed in this section of the country, can share that pride which we feel today. There were to be found among the charter members many who could be called the pioneers of organized orthodontia in America, trail blazers, if you please; men whose standards were so high that those who have followed have found it necessary to employ all of their talent energy and highest ideals to keep within the ranks. We still enroll among our members a goodly number of these pioneers; men to whom we owe great allegiance, honor, and respect. I commend their work, their lives, and their ideals to all of you, and charge that in emulating them you do not in any manner lower their standards.

CLINICS

During the past few years there have been spasmodic attempts at the organization of so-called orthodontic clinics or orthodontic departments of medical and dental clinics. Not all of them have been established with the aforementioned ideals in view, and it is concerning those that I wish to call the attention of the Society. While our Society covers a large territory my remarks refer particularly to its birthplace, namely that of the greater City of New York. It is in this part of our territory that these clinics have had almost a mushroom appearance, some of them though fortunately passing almost as quickly as they appeared. Probably I am too much alarmed over the situation. I hope so.

This past year I had occasion to inspect two of these so-called clinics, one of them (without any apparent equipment) was finally traced (after a removal) to the office of an advertising dentist, a member of no ethical society in this state. Unfortunately the other one was very widely advertised by one of our own members with the statement; "that he had opened a thoroughly equipped orthodontic clinic for worthy patients only." This clinic was found to be nearly as void of necessary equipment as was the first one visited and should be considered a discredit to that member and through him to our specialty and our Society. I believe that we should in some manner take steps to protect the public and the good reputation of our specialty and of our Society. I

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make no recommendation at this time, other than that you give it your serious thought and trust that it will cause this one member either to provide the thorough equipment he claims or else to abandon the idea.

In closing my administration I want to express my great appreciation for the kindly support which I feel that I have had at all times from 100 per cent of our membership not only in this year but since the organization of our Society, and I must commend to you for your sincere appreciation the efforts of the Executive Committee which, composed exclusively of the younger men, has served you during the past year. They have given you programs not only second to none, but, I am sure, you are willing to admit superior to any that have gone before. They have accomplished this exclusively by their own efforts, thus proving that we can safely leave the future of this Society and the future of orthodontia within the jurisdiction of this Society in the hands of the younger men, particularly those who during the past few years have been tried and found faithful to the trust.

THE ADVANTAGE OF STANDARDIZING OUR ORTHODONTIC UNITS AND MATERIALS*

By Harry E. Kelsey, D.D.S., F.A.C.D., Baltimore, Md.

PERHAPS the best approach to this subject would be by a brief allusion to the laborious experimental methods employed by the pioneers of orthodontia and a comparison of their methods with the possibilities which the technical field of orthodontia offers today.

Any one who is at all familiar with the history of the evolution of orthodontic appliances will have a picture in his mind of some of the very complicated and sometimes crude combinations of wires, springs, screws, and vulcanized plates, which stood for orthodontia, except in the minds of a few thinkers scattered through the many decades from the inception of the idea of tooth movement to the present time.

I remember well my experience while endeavoring to assemble a creditable orthodontic exhibit at the Dental Congress held during the Jamestown Exposition, in 1906, and although it was eventually thought to be creditable, it did not at all represent what I set out to make it, but to some extent it did represent the modern conception of orthodontia as it had taken shape in the mind of Dr. Angle and in the minds of the rather small number of graduates of his school, and in contrast, the older conception still held by the far greater number of men, who were using ancient forms of appliances and who looked upon the construction and operation of appliances as the whole of orthodontia, although it is not intended to imply that there were not many men at that time beside the Angle men who were beginning to recognize the broader scope of the field of orthodontia.

These latter ideas, were represented by as large a collection of miscellaneous appliances as could be brought together, while the more modern ideas were represented by the collection of about four hundred pairs of models then in the possession of the American Society of Orthodontia, and loaned with much reluctance to the Congress, because it was feared that the collection might be lost or damaged. It really was very beautiful, and well exemplified Dr. Angle's classification as well as numerous anomalies, and was later given to the Smithsonian Institute, or Medical Museum, in Washington, where it may be seen today.

It was my desire to secure from Dr. J. Nutting Farrar, author of *Irregularities of the Teeth,* a vast accumulation of appliances which he had constructed and used during his many years of practice, but I could not persuade him to let me have them for the exhibit, not because of the fact that they were constructed of gold, but because of the value he placed upon them as material upon which to base his second volume of *Irregularities of the Teeth.*

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I do not know what has become of the several large mason jars, which were filled with them, but it is a pity if they were, as is probable after his death, melted up for the gold. They would have been most valuable as an exhibit for any museum. Among them was almost every machine (as he often referred to an appliance) which he himself had invented and reproductions of almost every machine or appliance he had ever seen. In my endeavor to persuade him to lend them to the Congress, I went to New York and was treated with the greatest consideration and courtesy, but I did not succeed in persuading him to change his mind, for he really believed, as he said, that they represented ideas, which if lost, would constitute a calamity to humanity. His invitation to lunch was accepted, and later the afternoon was spent observing his routine attention to patients, and in one interesting case, he called in a technician and told him he was inventing a new machine to overcome a difficulty which had arisen, and discussed the details with him.

In spite of the complexity of orthodontic practice as it was conducted at that time, Dr. Farrar and many others frequently secured beautiful results, and were masters of a great many phases of orthodontia, which we regard as important today.

Dr. Case, Dr. Ainsworth, Dr. Guilford, and many other men of their type in this country and abroad, were also contributing to the colossal armamentarium of the orthodontist, but it must be said for those mentioned and for others also, that they contributed much to the fundamental principles which underlie both the theory and the practice of orthodontia today, and we are all enormously indebted to them.

For many years, Dr. Farrar's theory, that intermittent force was far less painful in orthodontic operations than was constant pressure, was accepted as being correct and, therefore, force exerted by means of screws, which could be turned up at intervals, came more and more into use.

I still believe that this is true for operations conducted in the manner in which they were at that time, because the constant pressure which was supplied by means of springs and elastic rubber as then used, provided such great force, that soreness was sure to supervene, as it is when teeth are separated by wedges or rubber, while the turning up even frequently of a screw or a nut on a threaded bar or arch permits of intervals of rest during which the tissues can accommodate themselves to the new application of pressure.

It was believed at that time that our appliances moved teeth, the idea not having then been formulated as we know and believe it today that we simply stimulate by mild but appropriate pressure metabolic changes in the tissues, which permit the teeth to move or actually move them toward the desired position.

No appliance used today, nor the much more heavy and powerful ones formerly used, can cause movement of a tooth in the mouth of a cadaver, for after death there is no circulation and no cell metabolism.

Today I think it is generally conceded that a light constant force applied as nearly as possible within the physiologic limit, is preferable to the intermittent application of pressure. The modern conception of tooth movement is very different, therefore, from that held in the earlier years of orthodontic

study and practice. Again, as a further contrast, it was difficult in those days to give a clear description of a case, there being no classification of malocclusions, and instead of referring to types or classes of cases presented in discussions and writings, each detail had to be minutely described, as also the laborious procedure of invention and construction of appliances with which to treat them, and then the treatment with all the innumerable modifications of technic and appliances devised, with the hope of meeting new conditions as they arose. This usually involved the removal of everything and the construction and insertion of new appliances, all of which is in strong contrast to the possibilities offered in our technic today, in which if we desire to make a change, it may be done readily because we have an anchorage which provides means for lingual or labial attachments.

In those days patients were seen daily or weekly, and it would seem that a dozen cases might have been sufficient to keep one man busy, and certainly would have done so, if he were painstaking and conscientiously used in every case what was then considered the best (because the most complex) appliance known to him. The frequent and extensive extractions which were resorted to, however, cut down the time spent on cases, as in many instances the extraction alone comprised the entire treatment of the case. What patients endured in those days in their heroic efforts to avail themselves of a cure for the distressing conditions accompanying malocclusions, is worthy of mention and provides much food for meditation for the orthodontist of today, who sometimes finds a lack of cooperation among patients, for whom things have been made so easy that they desire them to be made still more so.

Dr. E. H. Angle, first systematized the appliances already in use, and also improved the design. He, however, claimed originality for but very few appliances exclusive of certain features of the last three modifications of the labial arch, which were certainly devised exclusively by him. I refer to the pin and tube appliance, the ribbon and bracket band appliance, and the ribbon arch and tie bracket appliance, his last contribution to orthodontia. But his systematizing of appliances together with his classification of malocclusions, set us farther on the road than any previous achievement in the orthodontic field, as these advances were marked by a far broader conception of the true field of orthodontia than had yet been given to the profession. The lingual arch and the delicate and efficient adjuncts which may be attached to it, were the next great advance in technic, and it reached a high state of efficiency in the hands of Dr. Lloyd Lowry. While he may not have used it for the first time, he certainly first presented it as a practical appliance because he provided for its enlargement without removal from the mouth by means of a pair of specially designed stretching pliers. In his hands and in the hands of a few who acquired the skill to use it, it demonstrated clearly what possibilities lay in the lingual arch, but it attained a broad application in orthodontic practice only, when it was provided with a removable lingual attachment to molar bands. This was accomplished by means of what was originally known as the Young-Angle lock which was a vertical or nearly vertical oval tube, with an oval post to fit it soldered to the end of the lingual arch and secured by a loop of spring wire passing under the tube. The round

vertical tube had long before this been used by Dr. Ainsworth, and is often used today by some operators in combination with a suitable lock to prevent rotation of the anchor tooth. The combination and presentation to the profession, of the lingual arch in its removable form by means of the vertical tube and lock is due to Dr. John V. Mershon, and for the many useful ways in which it can be used, either as a plain arch or by serving as a base wire for the attachment of springs or other traction devices, we are also indebted to no one more than him, although many who have taken up its use since he introduced it in its present practicable form, have helped greatly in developing it to its present state of efficiency. At the moment I think of Dr. Oren A. Oliver, and Dr. Martin Dewey, as being perhaps the ones who have given the most time and thought to it, and the evidence of this is to be found in the numerous and exhaustive clinics they have given before many different societies, as well as the superbly illustrated papers read upon the subject.

The lingual arch and its valuable combinations and attachments together with a more intelligent conception of what tooth movement really involved, prepared the way for further simplifying our technic, while enchancing its effectiveness. However, notwithstanding the valuable qualities possessed by the lingual arch, it like all other appliances has no doubt been abused, or rather too much has been expected of it, and many have yielded to the temptation to try to use it exclusively, thereby inviting failure in many cases. But that has occurred in the past and will occur with every new appliance, or even idea, that is brought out.

There is another important phase in the construction of orthodontic appliances which links the past to the present, because it is still a matter to which much thought and research are being given. I refer to the old question of what constitutes the best metal or alloy for the construction of orthodontic appliances. Several decades have passed since the American Society of Orthodontists undertook a serious consideration of the comparative value of the various metals and their alloys in the construction of orthodontic appliances, as well as their reaction in the mouth, that trying environment in which they must be used.

At that time, the investigation was very well limited to an endeavor to settle the time-honored question as to whether base metal was at all suited for use in the mouth. For this investigation, the Society selected a man, who was not an orthodontist, but was nevertheless an honorary member of the Society, because of contributions on subjects of collateral interest. I refer to Dr. Clarence J. Grieves. He made exhaustive tests on German silver appliances which had been used in the mouth, and which were sent to him from all over the country by members of the Society, and upon his findings and the clinical evidence supplied by members of the Society the opinion was put forth that readily oxidizable metal was not suited for use in the construction of orthodontic appliances.

From that time, there was a very rapid decline in the use of the base metals, notwithstanding certain inherent good qualities they possess and of course there was a corresponding increase in the use of gold and its alloys. As usual it was believed the matter was settled and ideal gold alloys would

be immediately produced, but more than twenty years have passed and we still have not a thoroughly satisfactory gold alloy spring wire. Many have been produced which are ideal in certain respects, but all have faults, which keep the manufacturers constantly busy trying to overcome them. There can be no doubt that they (the manufacturers) have honestly endeavored to produce a spring wire that would have sufficient life in it to serve its purpose well and at the same time be uniformly free from cracking. Apparently it is a desperately hard thing to overcome when using platinum in the alloy. Personally I have often felt that some of the spring wire used by jewelers, although with a very much lower fusing point, might be satisfactory if we learn to use it properly.

I am glad to be able to say that a new investigation of this subject is being started at the Bureau of Standards in Washington, by the Research Associates of the American Dental Association, already working with the experts at the Bureau on the problem of dental golds and casting processes. So much success has attended their efforts along the first investigation that I feel very sanguine as to the outcome of the orthodontic gold problem which they are just taking up. Some of you have no doubt received the questionnaire from Dr. N. O. Taylor at the Bureau, and a request also for your opinion and experience regarding orthodontic spring gold wire, and I hope a ready response will be given to Dr. Taylor because we hope to have a preliminary report on this work at the meeting of the American Society of Orthodontists, in St. Louis, in April.

The idea is to formulate from the opinions of many experienced orthodontists the list of qualities which are most desirable in orthodontic spring wire and then to make an effort to produce an alloy which embodies them. This I believe is the first mention made of this research which the Research Commission of the American Dental Association has been able to undertake for the orthodontists, although up to the present time they have been unable to grant the American Society of Orthodontists its request for a special research fund. The value of the investigation will depend upon the cooperation of the orthodontists and as one of the Bureau of Standards Committee, I sincerely hope this may be realized.

Although scarcely indicated by the title as it appears in the program, it was in my mind, to treat briefly of the equally important phase of appliance construction which may be described as the standardization of the basic units or parts from which all but the most exceptional appliances may readily be assembled. The orthodontist has been no exception to the members of the parent profession in the zeal with which he has endeavored to employ in his practice every new material, method, appliance, or so-called principle offered to him by an enthusiastic discoverer, whether an orthodontist himself or a manufacturer; with the result that some time in his career the mouths of his patients contained an almost limitless assortment of sizes and gauges of tubes, wires, screws, bands, ligatures and whatever else may be adapted from its original purpose to the construction of orthodontic appliances. As a consequence then, he had to keep in stock all the hundred different devices and materials necessary to make a prompt repair in the all too frequent casualties

that must occur in such a heterogeneous mixture. In common with others I passed through this stage from which I thankfully emerged years ago, with a strong determination to reduce to the limit the number of basic materials and parts required to cover all but the most unusual conditions. In pursuance of this policy it was found that one form and size of buccal and lingual tubes, one standard locking device, one gauge of soft 14K. gold and pure silver lock wire, seven gauges of round hard spring wire, as follows: No. 0.045, No. 0.038, No. 0.036, No. 0.030, No. 0.026, No. 0.022, No. 0.020; the two Angle ribbon arch wires, two gauges of band material, No. 0.007 and No. 0.003, three grades of solder, 14K., 18K., and 22K., all in wire form would suffice. In addition to this a supply of Angle bracket bands and tie brackets is kept in stock as well as some of the Pullen seamless bands and a few dwts. of 14K. or 18K. gold plate for the biting surface of steep inclined planes.

A well-stocked supply house can furnish at short notice practically everything else which may be needed except for the repair of appliances in the mouths of patients referred from other orthodontists, which again emphasizes the importance of not merely a standardization in our own offices, but a general standardization of parts and materials throughout the profession.

This is brought to us very forcibly when a patient from some fellow-practitioner who uses a different buccal or lingual tube or probably both, calls on us for a repair which might be done very easily if the materials or units from which the appliances were assembled had been similar to ours, but becomes instead a difficult undertaking nor can it be done as well, if we have to put in some of our own parts, and there is also trouble for the first man when the patient goes back to him. I do not mean to insinuate that the square buccal tube I use and which operates perfectly with the square 0.036 wire or the round 0.036 wire, is better than some other that might be devised, and I should be glad to take all of my units and throw them in with others and make up out of the lot what might be a much more effective set, which could become standard for everyone.

THE INTERRELATIONSHIP BETWEEN NASAL OBSTRUCTION AND ORAL DEFORMITIES

The Action of Obstructed Nasal Breathing Upon the Mouth and the Facial Structures; an Historical Review

By W. Wallace Morrison, M.D., New York City, N. Y.

THERE is a relationship between obstructed nasal breathing and the mouth-breathing which is the direct result, and the development and formation of the lips, the teeth, the alveolar processes, the hard palate, the bodies of the superior maxillae and mandible, as well as the rest of the structures of the face, including the bony skeleton of the orbit, the nose, and the cheek, the facial musculature and other soft parts as well. That this relationship exists is known to every rhinologist and to every orthodontist. That the relationship is in all probability not merely one of simple cause and effect is not so generally realized, however. The truth of the matter is that the relationship constitutes a problem that is not new, and which cannot be fully answered even today, despite many advances in our knowledge.

The purpose of this paper is briefly to review the chief studies that have been made of this problem in the past, particularly in reference to deformities of the mouth in their relation to obstructed nasal breathing, as found in the literature up to 1926.

One of the first papers on the subject was that of Robert[1] in 1843. He called attention to the connection between the high, small hard palate and obstructed nasal breathing. He made his studies upon children with hypertrophied palatine tonsils, but he did not know exactly why these children had obstructed noses, because the condition that was almost certainly the real cause, that is, hypertrophy of the adenoid, was unknown until it was first described by Wilhelm Meyer,[2] thirty years later, in 1873. We now know that hypertrophy of the adenoid is so commonly associated with a similar condition of the tonsils, that Robert's cases were undoubtedly exactly similar to children seen daily in the clinic with more or less complete nasal obstruction due to an enlarged adenoid. The chief interest in Robert's paper lies in the theory which he was the first to advance, concerning the relation between the small, high-arched hard palate seen in these cases, and the nasal obstruction, and which contained the germ of an idea which seems as true today as it did then. He believed that the palate was narrow and highly arched because the nasal chambers were small, that is, both narrow in horizontal width and short in vertical height. He further believed that this condition of the nose occurred because the nose, and especially its floor, the hard palate, failed to develop normally, for the reason that the obstructed nose did not fulfill its function as an air passage. Like other organs which

are not put to their physiologic use, the nose fails to develop if such development is not complete because the stimulus to normal growth of full functional activity is lacking.

Tomes,[3] an English dental surgeon, in 1873 discussed the angulation or tilting of the alveolar processes and teeth so often seen with the high palate and obstructed nasal breathing. He first advanced an explanation for it which is still accepted by many students of the problem. He believed that during respiration with the mouth open, the tissues of the cheeks are drawn more or less tightly against the buccal surface of the premolar and molar teeth; this elastic and muscular pressure is abnormal, and causes the alveolar process and the teeth to be tilted lingually. In mouth-breathing the lips are parted, and hence the normal elastic and muscular pressure of these is lacking upon the incisor and canine teeth, and these tend to tilt forward, or labially.

Following the discovery of the adenoid by Meyer, as mentioned above, Michel[4] held it responsible for the occurrence of the narrow, high-arched hard palate. He also offered a reason for the actual formation of this high-arched palate with the obstructed nose. He stated that it was the strong inspiratory air current entering the mouth in mouth-breathing, and which constantly strikes the anterior portion of the hard palate, which is the cause of the failure of the palate to descend in its development, to assume the lower, more flattened form. He also pointed out that the scanty amounts of air passing through the nose in mouth-breathing are a weak stimulus to the proper development of the nasal passages themselves, as Robert had done.

Emil Bloch[5] in 1903 discussed this question again. He amplified the view of Michel by pointing out that the striking of the inspiratory air current in mouth-breathing affects chiefly the anterior portion of the hard palate, because, in the waking condition at least, the mouth is held open only sufficiently for the passage of air, and the tongue is quite closely applied to the posterior part of the palate, preventing the action of the air current on that portion. He likens the action of the air current to the dripping of water which in time wears away even hard stone. The gentle, but constantly repeated action causes the deformity of the anterior portion of the hard palate if the mouth-breathing goes on before its final development is reached, that is, during the first, and the first part of the second decade of life. Bloch also stated that he believed that the mouth-breathing with the associated failure of descent of the hard palate, was a common cause of deflection of the nasal septum. This combination is seen quite often, but just what the relationship between the two conditions is, is not fully known.

The theory of Bloch was still further amended by Körner.[6] He declared that the changes in the palate and the dental processes in mouth-breathing occurred in two stages, divided by the change in dentition from the deciduous to the permanent teeth. If the patient becomes a mouth-breather before the deciduous teeth begin to be shed, there will occur the high palate and the elliptical form of the alveolar arches, the lateral portions of which have been pressed toward each other by the pressure of the stretched cheeks, while the anterior portion becomes more bowed than normal, without becoming

angulated. The entire maxilla lags in its growth, and the more so the earlier in the child's development the mouth-breathing has begun, and the longer it has persisted. The position of the teeth is practically always normal. If the mouth-breathing persists during the shedding of the deciduous teeth, however, and the eruption of the major portion of the permanent teeth, the lateral portions of the alveolar processes approach each other still more closely, the jaw becomes relatively longer, the palate still more highly arched, sometimes assuming the gothic or pointed arch. The anterior portion of the alveolar process of the maxilla projects more and more forward, and finally bends in the median suture, so that the permanent incisor teeth not only protrude labially very badly, but often overlap like tiles on a roof. The more the entire maxilla, and with it the mandible in many instances, lags behind in its growth, the less space there remains for the eruption of the permanent teeth. This is sometimes of itself a factor in the delay of their eruption, which in the case of the first permanent molar is a very important cause of further deformity of the teeth and jaw. Even if the permanent teeth erupt at a normal time, they will be forced out of the normal occlusal line because of the lack of space for them. Körner did not ascribe to the action of the inspiratory air current on the palate, but did lay stress on the failure of development of the nose because of its functional activity, and upon the lateral pressure of the stretched cheeks. He also mentioned the fact that with the mouth open, the anterior part of the tongue is not applied closely to the hard palate as when the mouth is closed, and hence its muscular pressure, which may have an influence in spreading the alveolar process in the maxilla and teeth, is lacking. He did not mention a further factor which has been brought into this discussion more recently, namely, that in nasal breathing with the mouth closed normally, the tongue is applied so closely to the entire palate that the cavity of the mouth no longer exists, and that the tongue, with the mandible, and the floor of the mouth are held up by a gentle but definite negative pressure, with the tonus of the very powerful muscles of mastication in addition. This gentle suction in the closed mouth may have some bearing on the descent and development of the palate; it is certainly lacking in mouth-breathers.

Thus far we have considered views resting very largely upon clinical experience, and not upon scientific research in the more modern sense of the word, in which mouth-breathing has been discussed as the direct cause of the deformities under consideration. We must now mention some contrary views. A little consideration will undoubtedly lead us to certain objections to some of the theories that have been advanced. In the first place, an estimation of the delicacy of the forces that have been assumed as active in causing well-marked deformities in quite stout and rigid bony structures, such as muscular pressure and air currents, has led many to believe that these forces could not bring about the described results. This is certainly food for thought, but the objection may be quite well answered in the light of the modern achievements of orthodontia, by which these very deformities of the teeth and jaws are corrected by the application of mechanical forces which are

almost if not quite as delicate as those exerted by the stretched cheeks or the inspiratory air current, or the tongue, as described above.

Again it has been thought that the idea of the failure of development of the nose because of its inactivity in respiration was incorrect. The objection was raised that the nasal chambers may be considered as mere channels through which the air goes to and from the lungs passively, and hence that, biologically, inactivity would not be a factor in causing failure of development. In answer to this we must remember that even though the air passes rapidly through the nose in respiration, yet the nose performs a very important function with respect to the inspired air, warming it when it is too cold, moistening it when it is too dry, and filtering off foreign material of all sorts, including bacteria. Every rhinologist will agree that this function of the nose is of great importance, for he constantly sees the evil results of the want of it in cases in which it is partially or completely destroyed. Hence inactivity of the nose is a biologic aberration and can conceivably cause interference with the development of the nose, if it acts during the period of growth of the parts.

We come now to a third objection to the theories already given which rests upon such careful scientific investigation that we cannot easily disregard it. It has been noted by many authors that occasionally there were seen cases of congenital atresia of the posterior choanae, in which the most severe possible type of nasal obstruction has existed from birth, in which there was no deformity of the hard palate and mouth, such as we would most certainly expect if the previous theories were true. To this observation let us add the fact that at times, even with marked nasal obstruction due to hypertrophied adenoid, no palatal deformity is observed; further, several considerable series of cases have been reported which had the facial and palatal deformity commonly known as "adenoid facies," without having any nasal obstruction at all. These apparently unexplainable observations led Siebenmann,[7] and his students, Fränkel and Grosheints, to an extended research into the entire problem.

Fränkel[8] studied the face, nose, palate, etc., in a considerable number of living patients in Siebenmann's clinic, and found that the average palate ratio in the patients with adenoid hypertrophy, and hence with nasal obstruction, was not in excess of those having no adenoid enlargement. Grosheints,[9] upon the basis of extensive measurements of a series of skulls, states that (a) with the high-arched, small palate, or hypsistaphylia, there is usually associated a small upper facial skeletal development, or leptoprosopia; (b) small nasal cavities, or leptorrhine, and small orbits as a rule are found with the high-arched palate and small upper facial development; (c) the small, high-arched palate development depends in most instances upon a congenital racial characteristic of skull formation, and not upon postnatal and acquired conditions, such as nasal obstruction, at all.

Another investigator, Danziger,[10] advanced the view that neither the hypsistaphylia, nor the leptoprosopia are racial characteristics, but are a pathologic type, the consequence of an abnormal mode of development of the entire skull which is distinguished chiefly by an abnormally short dis-

tance between the pyriform fossa, that is, the vertical plane of the middle portion of the facial skeleton, and the foramen magnum in the base of the skull. From this point of view, Danziger considered that the nose was small and obstructed because the hard palate was high-arched, and that the nasopharynx was also obstructed because the palate was long in proportion to the short distance from the facial plane to the foramen magnum, and hence that the patient was a mouth-breather, and the high-arched palate caused the mouth-breathing.

Still another research worker on this subject was Alkan,[11] who began his study by measurements of the palates and heads of newborn infants. He finally agrees with the views of Bloch and Körner, as given above. Bentzen[12] also agrees, but concedes a predominant rôle to inherited predisposition, and says: "The great differences which we found in the palatal indices in individual groups of heads make it obvious that, even if it were possible to eliminate all the factors which *could* influence the height of the arch of the palate, it would still be variable, because there is even in the first anlage of the palate the germ of possible variations."

Another totally different viewpoint was advanced by Landsberger,[13] who believed that the problem of jaw formation is dependent upon the development of the teeth, and that the formation of the entire facial skeleton is controlled by the energy of growth of the tooth buds. With an abnormal development of the latter, the palate does not grow normally in width, hence the nose does not widen as it should, and the lateral nasal wall and the turbinates remain approximated to the nasal septum, so that nasal obstruction and consequent mouth-breathing results. Again, because of the abnormal tooth germ development, the alveolar processes increase in height, and the high palate makes its appearance.

There is one more view of the complicated problem. Franke[14] made a lifelong study, investigating the question upon the ground of anatomy, comparative anatomy, and embryology. His conclusion is that the abnormally high palate is dependent upon a developmental derangement due to a deficient local energy of growth, acting upon the hard palate in prenatal life, which tendency may be inherited. The high palate and the narrow jaw may make their appearance together, and yet be independent of each other. In this view, there is no bending or compression of a normal palate by external forces such as Bloch, Körner, and others have supposed, but a primary hypoplasia of the hard palate, the entire maxilla, or both.

CONCLUSIONS

It is evident from this brief review, in which mention has been made only of work that has led to new or different theories, leaving out much work done by many investigators which merely agreed with one or other of the older views, that the problem of the interrelationship between nasal obstruction, mouth-breathing, and associated deformities of the mouth and face, has certainly not been answered in full to date.

The consensus of opinion now seems to favor: (1) the view of Robert connecting the failure of development of the nose, and hence of the descent

of the palate and the related changes in the facial skeleton, the position of the teeth, etc., with the obstructed, hence poorly functioning, nose itself; (2) the theory of Bloch, that the high position of the palate in its anterior portion is due to the striking upon it of the inspiratory air current in mouth-breathing caused by nasal obstruction, and that the pressure of the stretched cheeks upon the sides of the upper alveolar process produces the inward tilting of these with their contained teeth; (3) the view of Körner, who believed that the palate is high, the upper alveolar arch an ellipse, and the teeth normally placed, if the nasal obstruction and the mouth-breathing occurred during and lasted only until the beginning of the second dentition, while if it persisted during the shedding of the deciduous teeth and the eruption of the greater number of the permanent teeth, the deformity of the palate and alveolar processes grows greater, the anterior teeth become angulated, while the entire maxilla lags behind so markedly in growth that the permanent teeth have insufficient space for their proper eruption and growth, and hence there may be a still further increase in the deformity of the mouth and of the occlusion of the teeth.

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VERTICAL MALRELATIONS IN DECIDUOUS DENTURES*

By Eda B. Schlencker, Rochester, N. Y.

WHEN I was honored by your committee with the request to give a paper on vertical malrelations, fear gripped my heart, for there is no phase of orthodontia I dread more to treat and none of which I am less certain. It may then seem rather preposterous that I am standing here before you. There was, however, one redeeming feature, namely, that I talk on vertical malrelations of the deciduous denture, and these hold less terror for me than the permanent ones.

The first conception of a paper is always chaotic to me. There is an outline of the things I want to tell, but I do not like to say them until they are properly arranged and sometimes the arranging is not a simple matter. I found it so in trying to create order out of the chaos of facts known and unknown, proved and guessed at in the matter of vertical malpositions. There was for instance the case of Johnnie A., interesting enough to bring to your attention, and the cases of Mary B. and Tommie C. But aside from the fact that they all presented vertical malrelations, there was nothing in common between them, and a paper just telling about them would lack continuity. And so I started to sort out the different cases and to group them according to some common characteristic. Almost immediately two divisions formed themselves: those with groups of teeth in vertical malrelation and those with just individual teeth in vertical malrelation. We cannot draw the line very sharply here, for as the result of even one malposed tooth we usually find other malpositions, but let us for the moment look at the one outstanding vertically malposed individual.

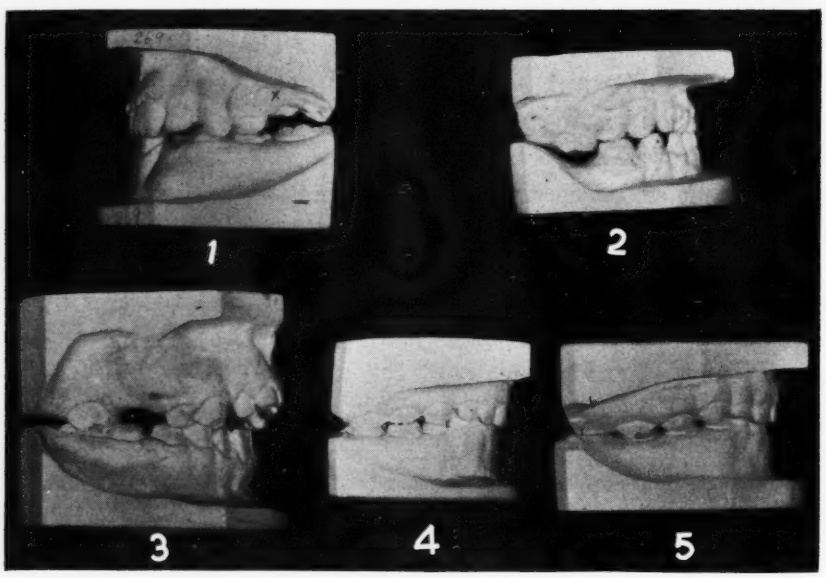
We find here two different types: The partially or insufficiently erupted tooth (Fig. 1) and the overerupted or maybe elongated tooth (Fig. 2).

The second division comprises the cases with groups of teeth in vertical malrelation. There are two definite types here too: The open-bite and the overbite which can in their turn be divided in three subdivisions: malrelation in the anterior region, in the posterior region, or in both (Figs. 3, 4, 5).

I have tried to pick out one or two examples of each type for discussion. It is ever a dangerous thing to generalize but particularly so in orthodontia where the many factors governing a case and the many combinations of circumstances make of each case a definitely individual one. But in order not to take up too much time I am going to chance a little generalization. Incidentally, I want to remark here that much of the work here shown was done by the interns in our clinic. Now let us consider the first division: that of individual teeth in vertical malrelation.

*Read before the New York Society of Orthodontists, Hotel Commodore, November 24, 1930.

Elongations of individual teeth in the deciduous denture are generally caused by lack of occlusion with the opposing individual, this lack of occlusion being the result of destruction of the opposing crown by caries or of extraction. Such cases on the whole are simple to treat. By this I do not mean that it is simple to push the tooth back into its socket. I doubt whether we do that at all, but by establishing an occluding surface we can guide the permanent successor into normal occlusion. I have used for this, to good advantage, a saddle, which serves both as a space retainer and as an occluding surface. This saddle can be made of precious metal or of vulcanite, and I prefer the vulcanite as it is more easily re-shaped to accommodate the needs of the expanding tissues and erupting teeth. In the matter of cleanliness it needs more attention than metal, though it is rather surprising how clean a well-fitting saddle can be kept by the patients themselves. There does not

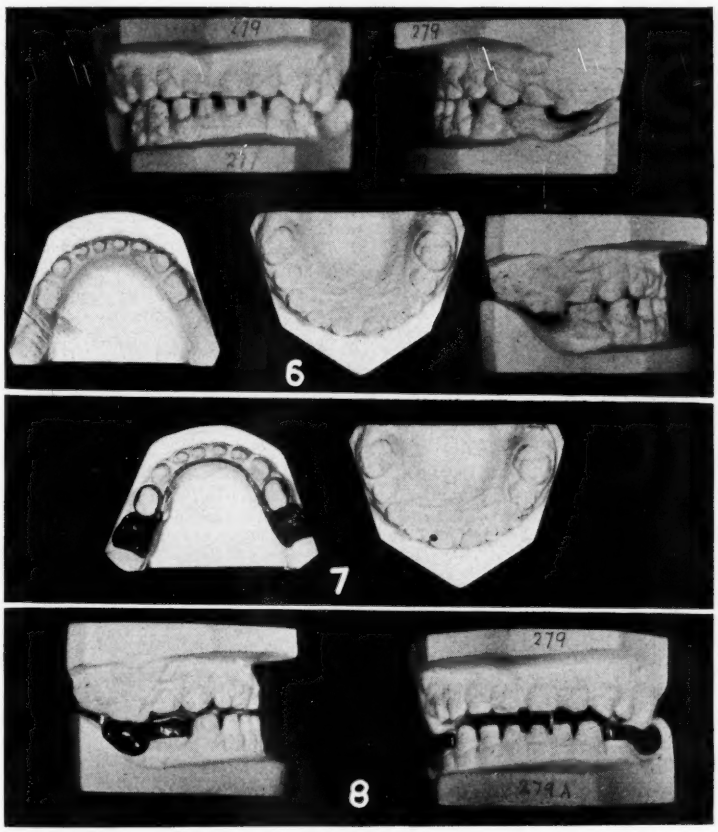


seem to be any special interference with the eruption of the permanent tooth under a saddle, and frequent x-ray examinations are made to check up (Figs. 6, 7, 8).

The second subdivision of individual vertical malpositions gives us the insufficiently erupted tooth which might as well be called impacted tooth, for that is just what it generally is. These impacted deciduous teeth seem very loath to erupt even after the normal amount of space has been provided and frequently have to be extracted to prevent interference with the eruption of the permanent tooth. However, it is my opinion that, if we could provide the space before the roots of the deciduous teeth are fully formed, or even before the process of absorption has started, eruption would be more normal, but so far I have not seen patients young enough to serve as proof. When removed at the proper time these impacted deciduous teeth do not seem to have a definite influence on the following permanent ones. That is, I have not found any marked malposition or sameness of malposition of the per-

manent teeth. There may be a slight tendency to rotation but not more so than in many cases lacking in bilateral width.

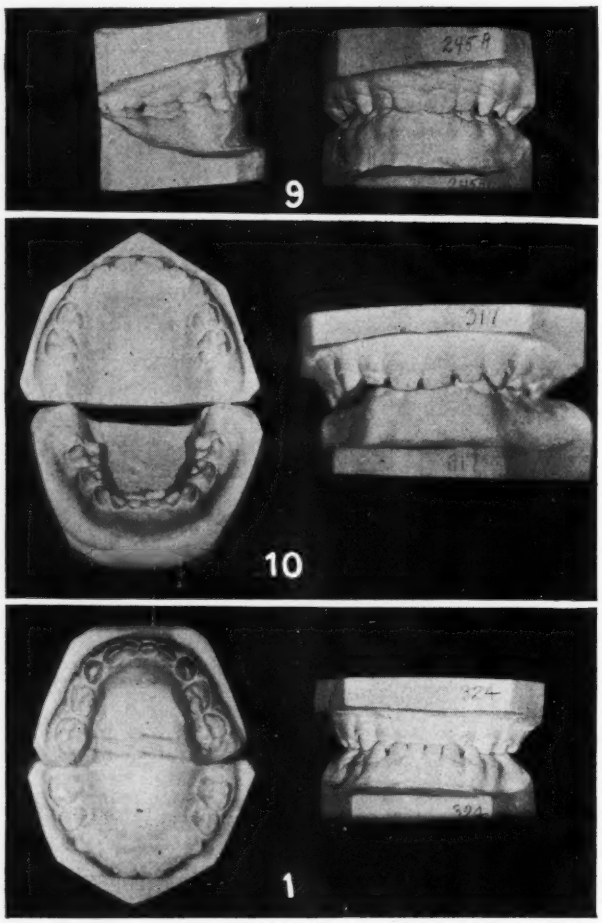
Treatment consists in making the required amount of space and guarding against too long retention of the deciduous individual. We use simple lingual appliances with finger springs for providing the space. In the few cases where I have tried to bring the deciduous tooth up to its normal position, I have failed or been but indifferently successful, but knowing my own limitations I do not believe that it is impossible; and I do most heartily believe that it is always advisable and that we should always try to save our young patients the shock of an extraction, however simple.



We now come to the second division, that of vertical malposition of groups of teeth. Here again we find the two subdivisions. I am not certain what the correct style in nomenclature is at present, so I shall stick to the old-fashioned terms of overbite and open-bite. Of these two the overbite seems most common, and I should say fortunately so, for in the deciduous denture it is less of a problem than the open-bite.

To me it is not always easy to draw the line between overbite and normal, for what looks like overbite at a certain stage, may later develop into a normal occlusion, particularly if the permanent first molars are not erupted. Therefore I keep those cases under observation without treatment, unless malrelation of the molars or a decided lack of spacing and crowding of the mandibular anterior teeth points definitely to the need of artificial stimula-

tion. Very often opening of the bite and a little expansion will prove sufficient in the simpler cases, and I have found some cases where treatment of only the mandible sufficed and the maxillary teeth seemed to follow unaided, making it seem more definite that the arrest of vertical development is almost always confined to the mandible. In opening the bite, the eruption of the first permanent molars should be observed carefully, for premature eruption of one may, in its rising above the occlusal plane of the deciduous dentition, stabilize its position so as to prevent the full eruption of its antagonist. Guid-



ing the permanent molars into proper occlusion is our safest retention and prevention against possible collapse.

If not treated, these overbites of the deciduous denture will very often result in an underdeveloped mandible with or without a posterior relation of the molars and the appearance of Angle's Class II malocclusion.

We use bite planes, crowns, onlays or saddles for opening of the bite. Crowns are used on second and first deciduous molars with locks on the crowns for the insertion of the appliances; unilaterally in the very young patients where the noncrowned deciduous teeth on the other side will still grow; bilaterally when root absorption has started and we depend on the permanent molars to take over normal occlusion. Onlays are used on first and

second deciduous molars when no further appliances are to be used at that time. Bite planes or saddles are inserted when there is a lack of occluding surface, bite planes being preferred when spaces have been lost.

I am going to show you now three varieties of overbite.

The first is the most common variety and the simplest, with the lack of vertical development in the mandibular molar region (Fig. 9).

Next is a far less common variety with overdevelopment of the right maxillary molar region due to lack of occlusion with the mandible which is entirely lingual to the maxilla (Fig. 10).

Third we find the overbite due to an underdevelopment of the maxilla. In these cases the mandibular incisor guide is of specially great help for it has been determined in the study of vertical growth that the mandibular incisors are invariably normal in their vertical arrangement (Dunn in INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY, July, 1929) (Fig. 11).

The three-point elastic bands can be used to good advantage in these cases.

The last and hardest to treat are the open-bite cases, often with maldevelopment in both jaws. We find many which are the result of habits, particularly thumb- and finger-sucking. If the causes are mechanical, primarily or secondarily, correction should not be so difficult, but if nutrition and faulty metabolism are causative factors, then the problem becomes a real one. These cases, usually of prenatal origin, should be treated at a very early age. They may be improved in the later stages, but the result is more uncertain. It has not as yet been definitely established whether faulty metabolism and malnutrition really have any bearing on these open-bite cases. Apparently healthy youngsters, with all the indications of normal metabolism may show open-bites, as well as the sickly ones. I have observed that there is a quicker response to treatment in the healthy child than in the unhealthy.

The cases which are the result of habit are either easily treated or else almost hopeless, depending upon whether the patient can be broken of the habit or not. Cooperation of the parents is not always dependable and the cooperation of a very young child is of uncertain quantity. By the time the child grows up to the age of understanding and is more open to reasoning, much harm may have been done. The breaking of the habit is the first and foremost phase of the treatment. In very young patients self-correction may take place after the habit stops. It is my policy to keep these cases under observation without instituting mechanical treatment, till the eruption of the permanent teeth indicates whether or not the permanent denture was injured. Lip and muscle exercises can be of great help if carried out faithfully.

The open-bite cases resulting from adenoids and mouth breathing, show a vertical overdevelopment in premolar and molar region mostly, sometimes complicated by underdevelopment of the anterior maxillary portion.

These cases even in the deciduous denture are not easy to treat. We may take the vertical relation of the mandibular incisors as our guide, but reduc-

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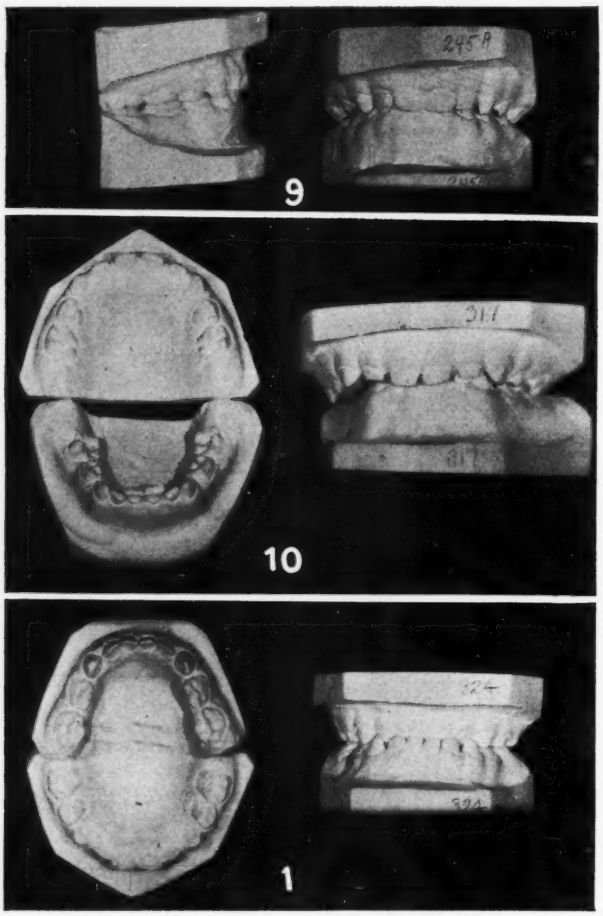

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These cases even in the deciduous denture are not easy to treat. We may take the vertical relation of the mandibular incisors as our guide, but reduc-

tion of the overdeveloped premolar-molar region is not a simple procedure and should be started early in life. Frankly I am not at all certain in my own mind as to the best method of treatment. The adenoid-tonsil cases usually show also a lack of bilateral width of the maxilla, and I have found that a quick expansion tends to lessen the overdevelopment in the molar regions. We use mostly lingual appliances with auxiliary springs and confine ourselves to guiding permanent molars and premolars into normal vertical relation, more than immediate correction of the deciduous teeth. It makes the treatment an extensive one though not necessarily continuous, but it gives us a permanent result.

In describing these different cases I have touched but lightly on appliances, and for a very definite reason. I do not believe that the appliance is the most important factor in the treatment, or that the same appliance will always give the same results in the hands of different individuals. All of us have some pet arrangement with which we work, and as long as we get results and aim at simplicity of contrivances, I feel that the kind of appliance used is rather immaterial.

In conclusion I wish to say that vertical maldevelopments to my mind are one of the fundamentals of our orthodontic troubles. If so, then the question arises: what can we do about it? There is but one answer—research.

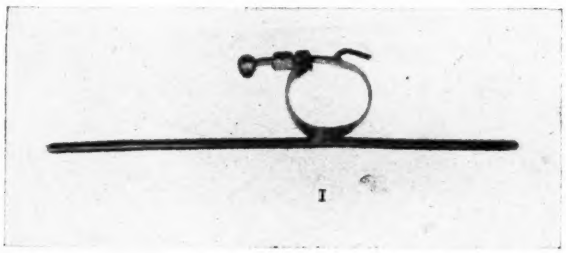
Also we still depend too much on eye diagnosis. And yet we have a fairly well established horizontal plane in the Frankfort plane. Somewhere there must be a relation between this and the vertical plane of the denture, somewhere an approximate norm can be found, and somewhere the causes of deviation from the norm should be unearthed.

APPLICATION OF ANOTHER ORTHODONTIC APPLIANCE

By Dr. Paul W. Simon, Berlin, Germany

IN THE field of practical orthodontia, I have already published a number of small papers.* I have added to this collection a further contribution entitled "System of Orthodontic Appliances," and I intend to give you today a short résumé of the contents of this new work in order to draw your attention and arouse your interest in it.

The appliance in itself is a complete unit, the parts of which are capable of so many combinations that it can deal with nearly all the therapeutic necessities from the beginning of treatment until the end of retention. Only very few auxiliary aids are needed. An important feature is the material of the arches which consists of Wipla (rustless steel from Krupp), the advantages of which need not be emphasized any further. The molars are made of Wipla or Nickelin (German silver).



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I want to give now a short description of this appliance. A detailed account of the method of construction and practical application is found in the above-mentioned book.

THE SPRING-BEAM APPARATUS

The molar bands have a lingual beam of 1 to 1.5 mm. thickness. The screw lies buccally and has a vertical tube of 2 mm. length on its forward end. Behind the screw there is a hook for elastics.

The arch, called spring arch, consists of elastic Wipla wire 0.7 mm. thick. It possesses an extraordinary "biological" efficiency both with the smallest child and with adults.

The parts of the arch can all be bent with the help of one or two pliers, and annealing is not necessary even at the sharpest bends.

The different parts of the spring arch are as follows:

1. The lock consisting of the recurved pin, the back loop and the lock-ring.

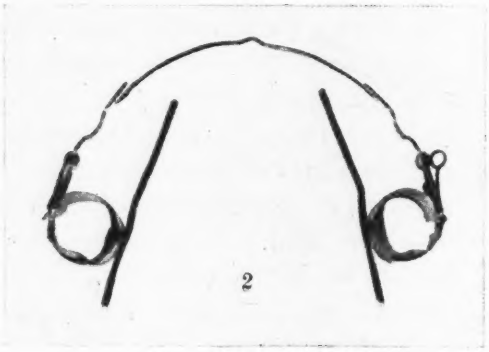
2. The vertical loop which is used to change the length of the arch.

*"About Plain Bands and Accessory Appliances in Orthodontia," 1922; "The Treatment of Expansion in the Upper Jaw," 1925; "About New and Proved Appliances in Orthodontia," 1928, printed by the *Berlinsche Verlagsanstalt.*

3. The hooks for intermaxillary elastics (they are bent, not soldered).
4. The part over the front teeth.

To enable a quick and always accurate bending of the vertical loop, I have pliers manufactured to bend these loops, a simplified modification of the pliers by Dr. Federspiel (Milwaukee).

The form of the spring-beam apparatus is shown in Figs. 2, 3, 4. Its advantages are the following: neat appearance, close fitting without irritation, hygienic action, no change of color (as is found even with platinum-



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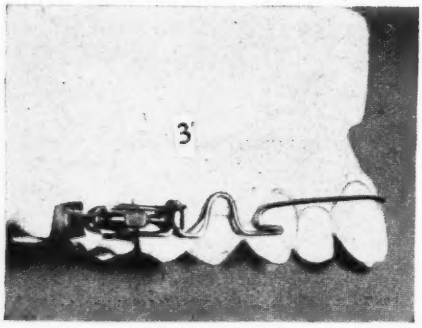

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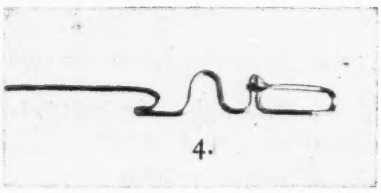


4.

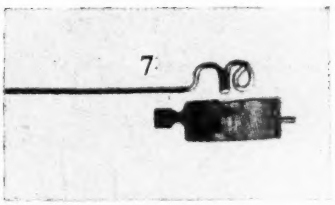
gold), biologic efficiency, firm fitting without any other special attachment, ligatures unnecessary, proper distribution of the gentle pressure in expansion of the lateral sections of the arch (principle of the beam apparatus), only slight adjustment needed at long intervals, etc. Also the price must be mentioned. The material of a Wipla spring arch costs twopence halfpenny, an imitation Swiss arch costs 3/9, a platinum-gold arch 25/-.

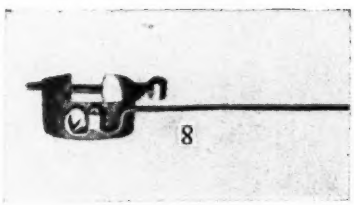
THE WIPLA LINGUAL ARCH

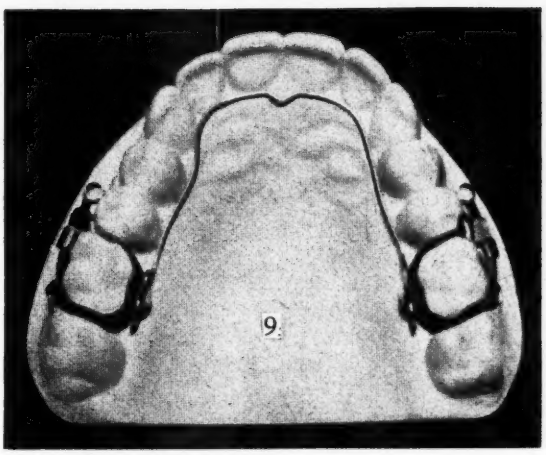
This lingual arch is also 0.7 mm. thick. I have constructed a new lingual lock which can be very easily made; it costs nearly nothing and has a better fixation than all the locks known to me.

Instead of the above-mentioned "spring-beam band" a "spring-tube band" is used, the lingual side of which has a vertical flat tube, 2 mm. long, instead of the beam (Figs. 5 and 6). These bands are also to be had in Wipla or imitation, but the tubes can also be had singly in genuine metal (price fivepence halfpenny), which are recommended because the edges cannot be bent by masticating.

The bend of the lock of the lingual arch consists of the already mentioned recurved pin, snapping into the tube from the occlusal side, and of a







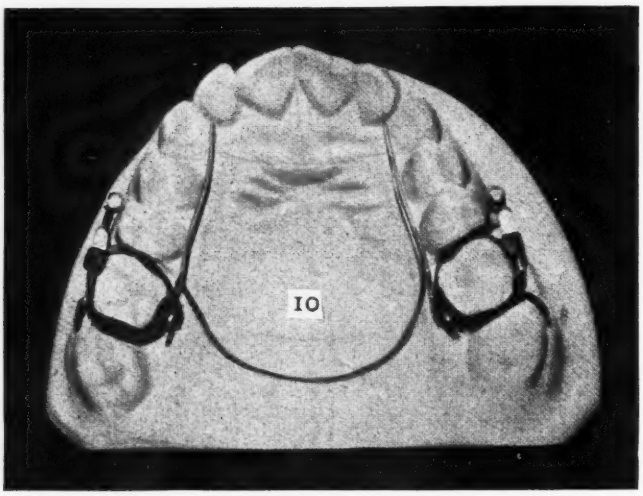
small bend behind the recurved pin, in the manner of a loop which does not lie in the same vertical plane, but is bent inward a little against the tooth. In this manner a gentle and continuous pressure is produced which makes the arch fit as tightly as though it were soldered. Nevertheless, the arch can be taken out of the mouth with pliers or with a hooked instrument without any difficulty (Figs. 7 and 8).

This lingual arch serves in the usual manner as an active correcting agent, either directly or combined with finger-springs, the attachment of which will be described later on. It is also very useful as retention. It is

also very clean, does not irritate and can be removed temporarily, while leaving in the bands. Also subsequent changes are possible without the inconvenience of a new appliance. (Fig. 9.)

THE LINGUAL SPRING-BEAM APPARATUS

It consists of two spring-tube bands and of a lingual arch. Only it does not run around the necks of the teeth as the arch just described, but it is adjusted as a transplatinal strap wire. At first the lingual lock is made at one end of the Wipla wire, 0.7 mm. thick. It is bent forward to the canine



of the same side, then it is sharply bent around and back to the lock, running now over the palatal to the other side where it is bent in the same way. (Figs. 10 and 11.)

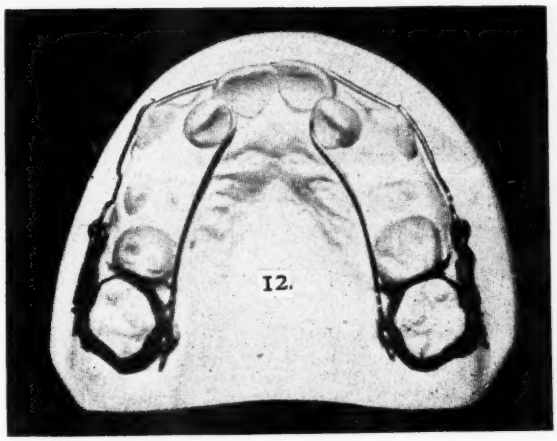
In the mandible the middle part of the arch lies below the lateral beams and the necks of the front teeth.

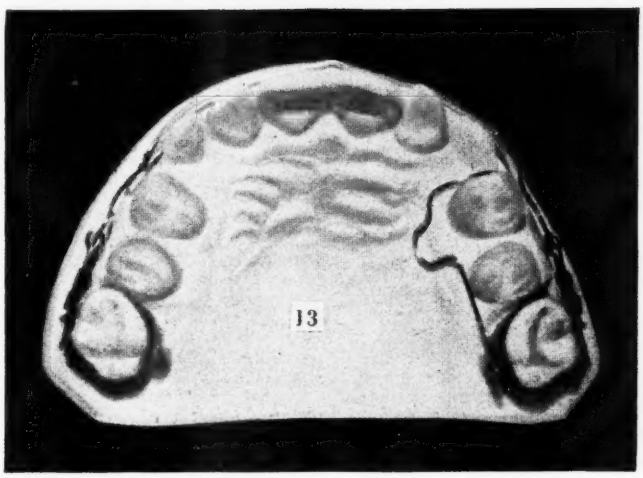
This apparatus conforms to the latest type of the American lingual arch, but it is superior to it on account of the simplicity of its construction, its cheapness and its more favorable efficiency—the latter, for the reason that during expansion the direction of the lateral teeth (from the molar to the canine) are moved in a straight line.

The lingual spring-beam apparatus is advisable for all cases of simple expansion, also with the deciduous teeth.

REMOVABLE BEAMS

In most cases it is sufficient to employ the spring-beam bands (with fixed beams). However, sometimes it is of advantage to be able to take off the beams, to bend them or to replace them by new ones. The removable beams provide, further, the possibility to use either the beams themselves as finger springs or to make them carry special finger springs during treatment. This happens in cases where the canines and premolars are not in the same align-





ment. Spring-tube bands are used, the beams consist of Wipla wire 0.7 mm. thick, they are given the above described lingual lock and are bent forward as desired.

Fig. 12 shows straight beams, Fig. 13 a beam as finger spring for the distal movement of a premolar. The vertical loop is used for adjustment of the spring.

It is possible at any time to remove the beams, to take an impression, in which the lingual tubes will be marked, and to bend new beams on the model. With some practice it is not difficult to make the beam in the mouth without any impression.

At the end of treatment—and after removal of the beams, the lingual retention arch can be made from an impression without taking out the molar bands.

FINGER SPRINGS

The finger-spring consists of platinum-gold wire 0.5 to 0.6 mm. thick.

As Wipla wire cannot be soldered with hard solder it is necessary to use the following method (Fig. 14). Take a piece of band material (gold or cos-

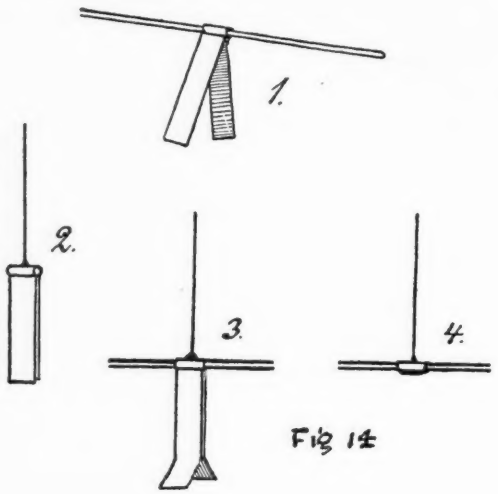
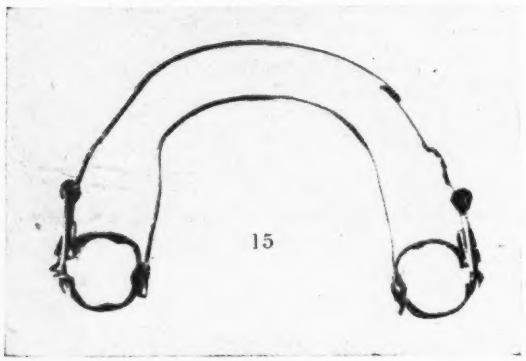


Fig 14



mos) 0.1 mm. thick and 3 × 30 mm. long, and pinch it around the arch with pliers, at the desired place, fitting it very tightly; afterward it is taken off and one end of the spring wire is soldered vertically to the midst of the tube with gold-solder. The tube with the soldered spring has now to be soldered to the arch with tin and the surplus of the plate is cut off. The springs are as firm as if they were directly soldered.

The Wipla spring is attached to the arch in the following way: Put the end of the spring wire on the desired place on the arch, parallel to it, then form a tube out of the band-material around both wires (as mentioned before) and solder together with tin.

RÉSUMÉ

In conclusion I should like to sum up the possible combinations of the above-described appliances.

The spring-beam apparatus most generally used allows the use of the ordinary labial arch or of the high labial arch. This latter is used because it is inconspicuous and also for attachment of finger springs; these can also be combined with the deep labial arch.

If spring-tube bands are used, all the different kinds of attachments can be employed—either at the same time or one after the other. Therefore it is possible to use the labial spring arch (deep or high) and on the inside the removable beams or the lingual arch or the lingual spring-beam apparatus. At any time of the treatment it is possible to perform each wished-for combination after an impression without being forced to remove the bands. A number of useful combinations are indicated in the detailed work.

Finally I want to mention that I have been using these appliances for a long time in my private practice and in the clinics and that I am very well satisfied with them.

DEPARTMENT OF
ORAL SURGERY, ORAL PATHOLOGY AND SURGICAL ORTHODONTIA

A PLEA FOR BETTER AVERAGE HARELIP REPAIRS*

By Vilray P. Blair, M.D., and James Barrett Brown, M.D., St. Louis, Mo.

IF ONE compares the average result obtained by the surgical closure of a cleft lip with the theoretical possibilities of such a procedure, the operation itself might be judged the most difficult in surgery.

To be classed as a good repair, there should result a pleasing appearance, a free breathing space, and approximately normal occlusion. A good repair makes for better health, happiness, and usefulness.

Early closure of the lip is important in that it allows the mother to exhibit her baby without apology, it helps control respiratory infection, and feeding is made easier for both the mother and baby. If a lip is closed soon after birth over an open alveolar cleft without anything being done to the bone, the alveolar arches will be compressed into approximately normal position by the pressure of the lip, within twelve months, in a large majority of cases. We prefer to close the lip as early as possible, even within the first forty-eight hours. Although the procedure is difficult in small infants, the above advantages to the baby and its mother outweigh the disadvantages to the surgeon.

The normal contour of the lip should be studied and its surface anatomy approximated as closely as possible, except that the philtrum is not reconstructed because at least one ridge is always missing. The absence of the philtrum is not very noticeable.

A deep appreciation of sound underlying principles, skill in applying them, and the avoidance of false moves, may be classed as necessary essentials.

A knowledge of classification of clefts is important, but the repair of the lip cleft is basically the same for all degrees of cleft including those in which the alveolus and the palate are also cleft. In all stages there is some actual lack of tissue at the lower border of the lip, some lateral displacement of the

*From the Department of Surgery, Washington University School of Medicine, St. Louis, Mo.
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two halves of the lip to either side of the cleft, and some flattening of the nostril on the affected side, the degree of each being in some proportion to the width of the cleft. The specific objectives of the operation should be to bring about the best possible immediate restoration of the lip, ala, and floor of

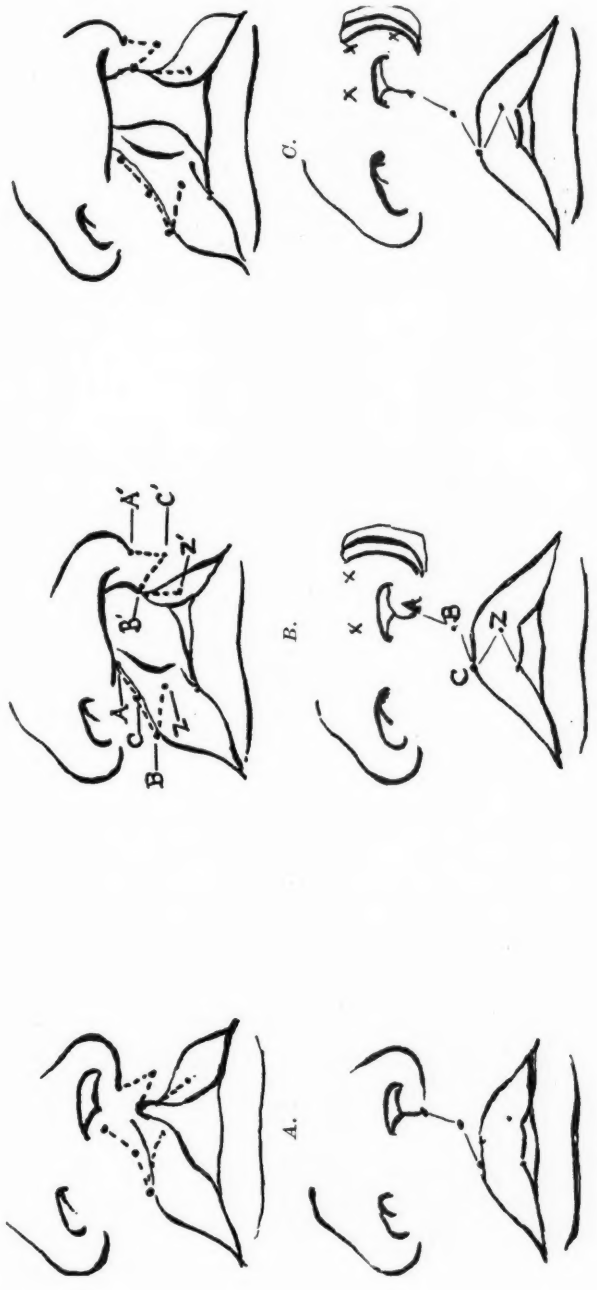
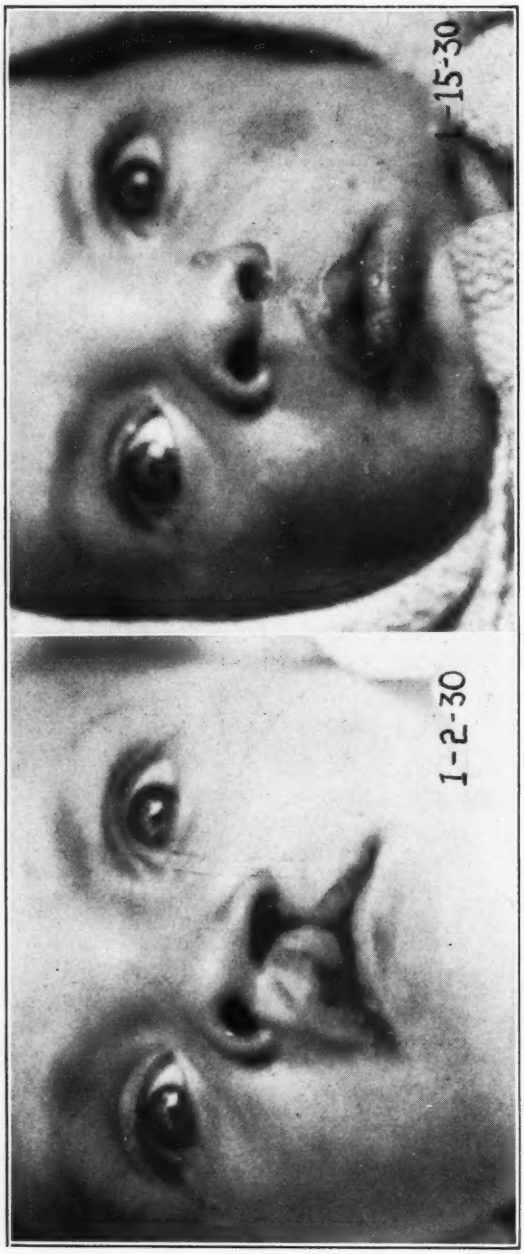


Fig. 1.—Plans of repair based on the original Mirault operation. Points *A B C* and *A' B' C'* are pricked in with a pin or needle, using methylene blue. *A* is placed on the mucocutaneous junction just above the point at which a line corresponding to the oblique base of the columella would intersect the vermilion. Usually in a complete cleft of the lip, there is a very slight shallow notch in the skin at this point. *B* is placed just where the ridge that bounds the philtrum on the opposite side meets the mucocutaneous junction; *C* is a point halfway between *A* and *B*. While it was stated that the points *A*, *B*, and *C* were placed in the mucocutaneous line in practice, they are put just within the skin border so that when the incisions are made, the marks will still be visible as guides in placing the sutures. In a partial cleft, *A* is located just on the inside of the defect of the lip instead of along the mucocutaneous junction which in this instance does not extend up this far.

On the outer side of the cleft, *A'* is put just beyond the point of the ala. By drawing the lip downward and outward, the exact point where the ala joins the lip will become visible. The placing of point *C'* requires some consideration. It should be under, and rather internal than external to *A'*, and at a vertical distance from the vermilion border equal to the vertical distance between *B* and *C*. *B'* is on the mucocutaneous line at a distance from *C'*, equal to *BC*. The distance from *A'* to *C'* must be equal to or less than the distance *AC*, but if *A'C'* is less than the distance *AC*, the cut is brought to the proper length by making it curved.

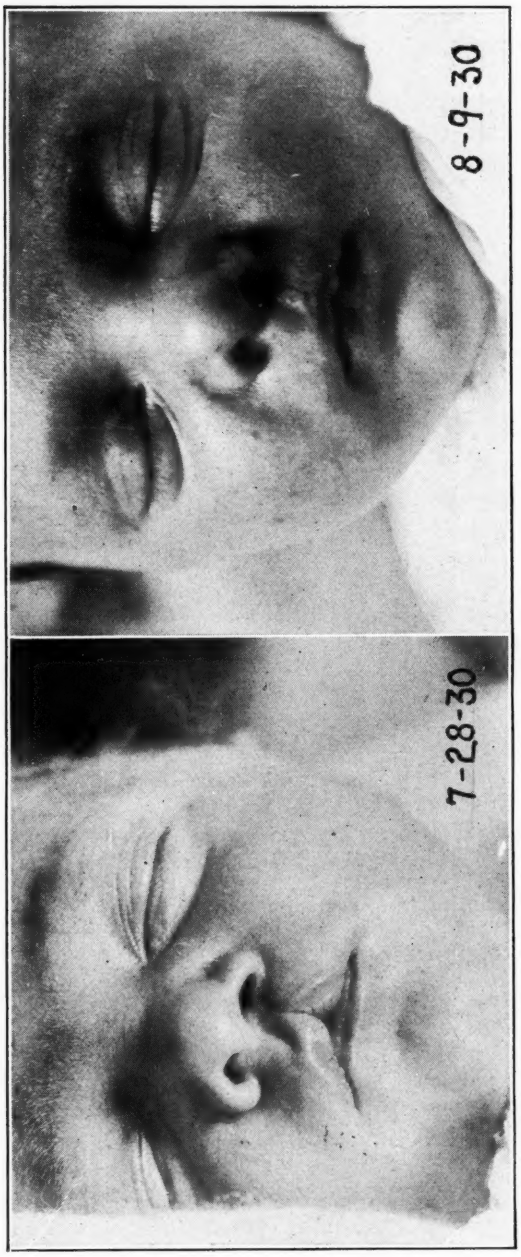
In suturing the lip, *A'* is brought to *A*, *C'* to *C*, and *B'* to *B*, but before suturing *B'* to *B*, it is necessary to make the incisions *BZ* and *B'Z'*. *BZ* is fitted into *B'Z'* and excess on the *BZ* side is discarded. If a notch remains on the *BZ* side the point *Z'* is sutured across under *BZ* and in many instances a full rounded vermilion is thus obtained. No cut is made from *A'* to *B'* at this time because some or all of the skin included within the area *A', C', B'* can be utilized in forming the floor of the vestibule, a place that is sometimes very deficient in lining.

the nostril. If these are well accomplished, subsequent growth should further improve the result by bringing the external nose to the midline and gradually closing the open alveolus. Any sort of lip closure if done early enough, no matter how unsightly, will usually be followed by a good approximation between the maxilla and premaxilla, but, if the floor of the nostril is made too narrow,



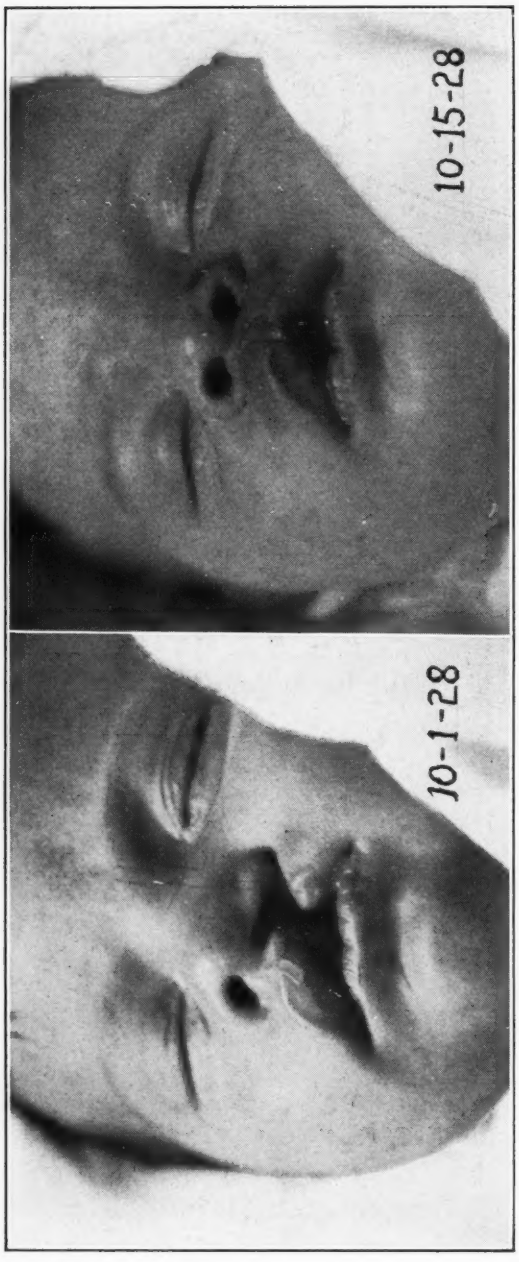
A. *B.*

Fig. 2.—*A* shows wide open cleft with displacement of columella away from the cleft side. *B*, Result thirteen days later showing good nostril level and contour. The columella has a slight overcorrection to the cleft side.



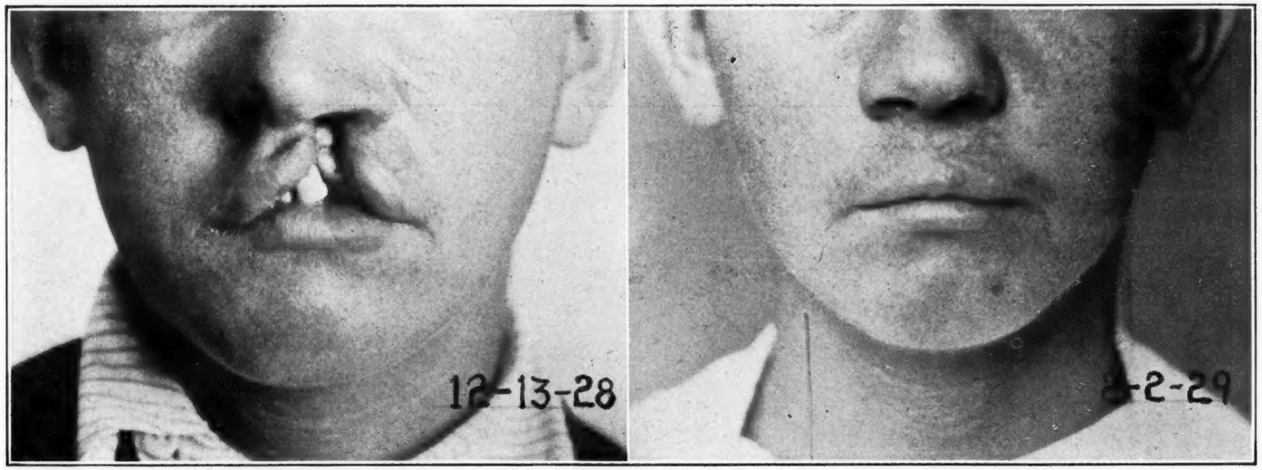
A. *B.*

Fig. 3.—*A*, Partial cleft that presents for consideration practically all the points of a wide open one. In the operation these are all split clear into the nostril. *B*, Result twelve days later.



A. *B.*

Fig. 4.—*A*, Wide open cleft, nostril stretched out into a straight band. Marked deviation of columella. *B*. Result fourteen days later. Operation includes wide undermining of cheek and nose, replacement of columella and rotation into correct level and contour of nostril.

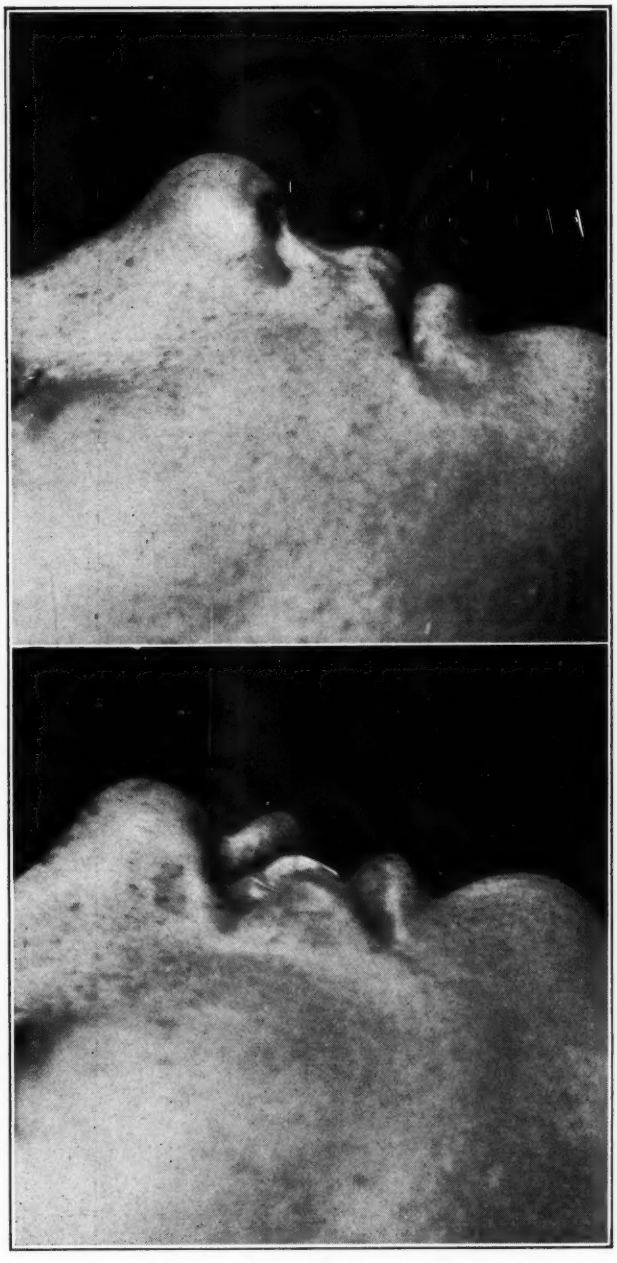


A. *B.*

Fig. 5.—*A*, Cleft repair delayed until fifteen years of age. Note bony distortion of nose toward the sound side; this can be prevented by properly placing the soft parts early in life. In some instances it is necessary to cut the bony nose entirely free and anchor it over toward the cleft side to get good symmetry. *B*, Result obtained by the lip operation plus the splitting of the columella, excision of a triangle from the edge of the nostril and rotating it into position.

B.

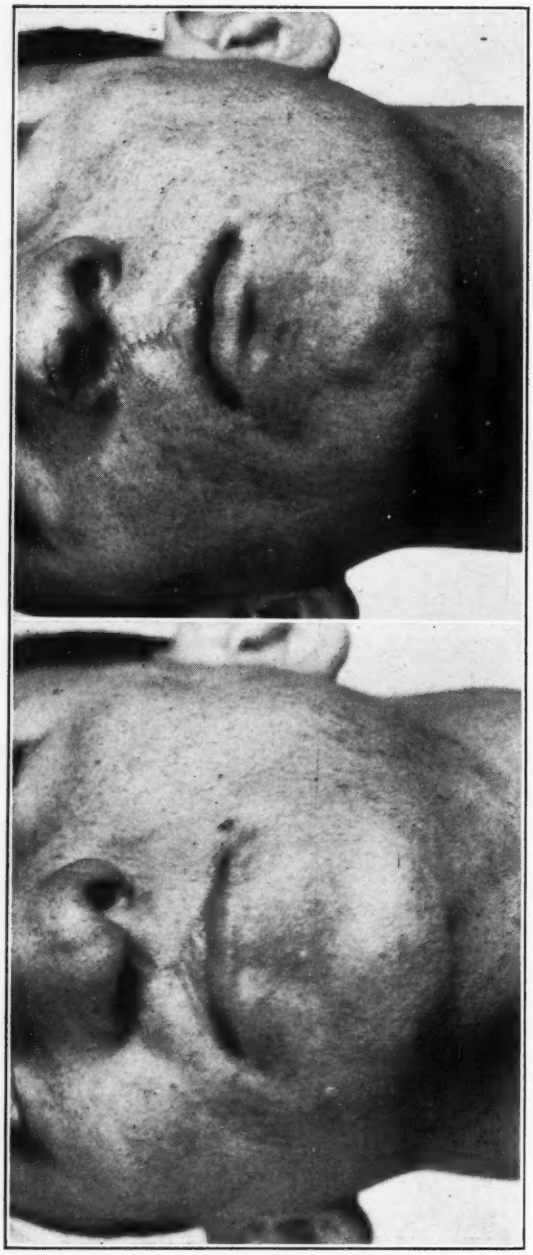
A.



C.

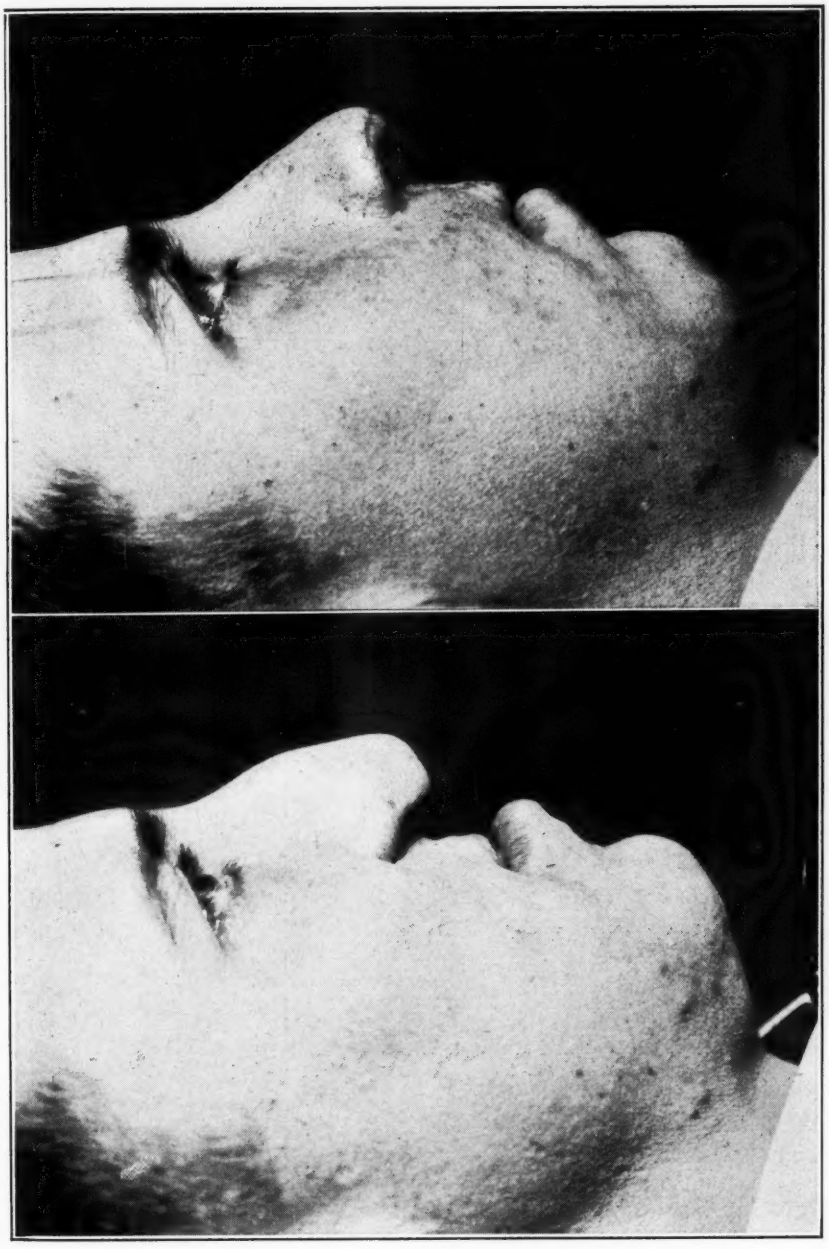
D.

Fig. 6.—Late repair of a slightly more marked deformity than in Fig. 5.



B.

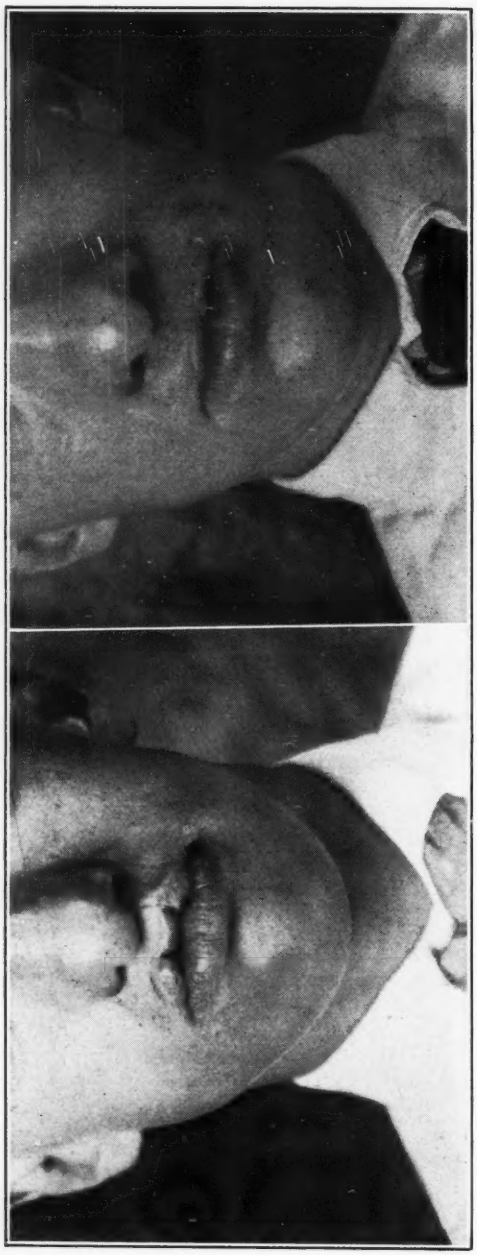
A.



C.

D.

Fig. 7.—*A* and *C* show late secondary repair of a complete cleft, where the primary repair did not correct the nostril or columellar displacement. *B* and *D* show correction obtained by opening the lip, splitting the columella, taking a triangle out of the edge of the ala and rotating the nostril into position.



A. *B.*

Fig. 8.—*A* shows usual result of a double lip when the vermilion of the prolabium is utilized in the primary closure. *B* shows result of opening the lip, and bringing the sides together under the prolabium after removing its vermilion, and advancing the columella on the septum.

this produces permanent obstruction; if too wide, it will be followed by increasing displacement of the external nose to the opposite side.

A plan of operation is important, and any one of a number may give good results if skillfully carried out. For the past ten years we have concentrated on the basic principles of the Mirault (1844) operation in which a small flap is taken from the cleft side where it can be spared and put down just above the vermilion border where there is the main defect. Along with this has been worked out a fairly satisfactory manner of freeing and shaping the nostril and its floor (Fig. 1). The use of a single type of operation, accurate planning, measuring, and marking will make for the best results. Accurate, readable records and drawings will do much for improving results.

Extreme accuracy is necessary in planning, cutting, and suturing. One sixty-fourth of an inch one way or the other will make a noticeable difference. The calipers as introduced by Thompson should be used, but in the final analysis the eye will give the most accurate check.

Whether the cleft is wide open or just a notch in the vermilion border, there will be some spreading of the nostril. Better results, both cosmetic and functional, will follow a correction that in part rotates the axis of the nostril rather than relying entirely upon removing tissue from the floor (Figs. 2 and 3).

In infants or young children this rotation can usually be partially or completely accomplished by mobilizing the base of the columella and related nasal mucosa, contouring of the ala, and proper suturing of the floor.

In older children, over three or five years, this simple mobilizing of the columella and septal mucosa may not be sufficient. In such cases the columella is deeply split longitudinally and the half columella on the cleft side, together with the adjoining mucosa, thoroughly freed by deep undermining, preferably without breaking through the septal mucosa. Next the skin of the tip of the nose is undermined and a triangular piece of the latter is removed from above the displaced nostril. This permits the freed half of the columella to be sutured forward, which will allow the displaced nostril to be rotated into its proper position. Replacing the nostril also restores the external contour. (Figs. 5 and 6.)

Secondary repairs are necessary in a large number of cases; but the more nearly normal the primary operation reproduces the nostril level, floor of the nose, and columella position, the less extensive will be the secondary procedure. (Figs. 7 and 8.)

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METHOD OF SECURING FRESH HUMAN TISSUES FOR HISTOPATHOLOGIC INVESTIGATION OF PERIODONTAL CONDITIONS*

By James L. Zemsky, D.D.S., New York, N. Y.

IN AN article which will soon appear in the *Dental Cosmos* I am pointing out several sources from which fresh human material can be obtained for histopathologic investigation of periodontal conditions. The present paper is devoted to a description of the technic which was successfully employed in securing such specimens.

There are two requirements of a material that is suitable for the purpose of studying histopathologic changes in periodontal conditions. These are: (1) the material must consist of freshly fixed human tissues and (2) the normal relationship between the various structures making up the periodontal tissues (i.e., the gingiva, periodontal membrane, alveolar bone and cementum) must remain undisturbed.

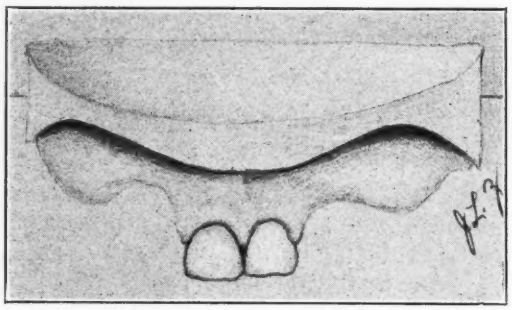

Fig. 1.—A drawing of a plaster cast of the maxilla of a patient fifty-one years of age. The patient had a partial upper denture, which was very unsatisfactory. He was advised to have the central incisors extracted and a full denture made. He hesitated at first to have this done, but later decided to have the central incisors extracted. This case presented a unique opportunity to secure excellent material for histologic study of periodontal conditions. A specimen containing both central incisors was removed, together with the surrounding structures.

In the above alluded communication I have grouped under six headings the types of patients which serve as sources for supplying the desired material. These are:

1. Patients with serious systemic disturbances demanding the elimination of all possible oral foci of infection.

2. Patients with isolated teeth interfering with proper prosthetic restoration.

3. Patients with treated pyorrhetic teeth who decided to have them extracted and prosthetic restorations made; the proper construction of which would necessitate the excision of the surrounding prominent ridges.

4. Patients presenting cysts and other neoplasms.

*From the Laboratory of Oral Histology and Embryology; Professor Charles F. Bodecker, Columbia University Dental School.

5. Patients presenting fractures, necrosis, osteomyelitis of the maxillary bones and other oral diseases demanding surgical removal of adjoining teeth.

6. Patients presenting prominent alveolar ridges and short lips.

So much for the first requirement.

In order that the histologic material should satisfy the second requirement, its surgical removal from the surrounding tissues must be performed in such a fashion that neither should the teeth be displaced from their sockets nor the gum torn away from the underlying structures. If this is not accomplished the specimens secured are not of great value for the purpose intended. It is for this reason that I have thought it advisable to present a short paper giving a brief description of such a procedure.

THE PRINCIPLE OF THE TECHNIC

The technic is rather simple and should prove effective in the hands of any one who is accustomed to handling surgical instruments. For the purpose of a clear presentation, I am presenting drawings of specially prepared models in preference to actual cases. By means of these models the technic can be demonstrated with much greater clarity than on patients. Due to the use of these models certain features will be found considerably exaggerated; this, however, is unavoidable when a schematic method of presentation is chosen. In the description of the illustrations attention will be directed to these exaggerations in order that no wrong impression may be created, thereby preventing the occurence of any possible mistakes in performing the operation.

Before passing to the description of the technic the general principle which is laid down as a foundation for this operation must be stated. This may be formulated as follows: *No force is permissible during the entire procedure.* To elaborate it should be said that every incision must be deliberate regardless of whether it is in the soft tissue and done by means of a scalpel or in the hard structures and made with a chisel and mallet. After the specimen has been separated from the surrounding structures, it ought merely to be lifted off its seat. The reason for this should be obvious; if the various incisions are made incomplete, considerable amount of force will be necessary to dislodge the section and this will result in tearing away the peridental membrane from the bone or cementum thus severing the attachment from the bone and the teeth, the existence of which may be the very thing one seeks to establish.

DESCRIPTION OF THE TECHNIC

After selecting the patient, the parts which have to be operated upon are anesthetized, the conduction method being that of choice. The type of case herein described, as well as the treatment presented, is typical and therefore illustrative of the method offered.

The model shown in Fig. 2 is that of the mandible of a woman forty-eight years of age. She was wearing a full upper and a partial lower denture for several years. The retention clasps of the lower denture caused formation of cavities in both mandibular canines. There was a considerable amount of pus discharging from all the pockets around the teeth. The patient, who had been

suffering from severe headaches, decided to have the remaining teeth removed and a full lower denture inserted. Since the ridge showed marked absorption, the mere extraction of teeth would result in a deformity (Fig. 3) making a satisfactory restoration impossible. In order that a good prosthetic appliance could be made, resection of the prominent ridge would have been necessary. The patient was subjected to the method of procedure described later and the same result was obtained as if an alveolectomy had been performed.

After the level to which the ridge must be reduced is determined approximately, two horizontal incisions are made, one labially, the other lingually (Fig. 4). These are made through the mucosa and periosteum to the bone. The incisions are carried from ridge on the right side to ridge on the

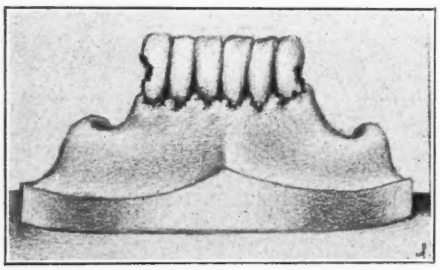

Fig. 2.—A drawing of a specially prepared model representing the mandible of a patient, forty-eight years of age, with six anterior teeth. She had been wearing for years a full upper denture which was very satisfactory; the lower partial, however, gave her much discomfort, but because she was told that the lower full denture could seldom be made successfully, the patient decided to keep the few loose and pyorrhetic teeth as long as possible. She had been under the care of a periodontist for many years, but the condition was never cured. There was copious discharge of pus from the deep pockets and extensive caries developed in both canines. In addition, the patient was suffering from severe headaches, and her physician advised the removal of the diseased teeth. This was a typical case offering an opportunity to secure good material for histopathologic study. The following illustrations are used to demonstrate the technic employed.

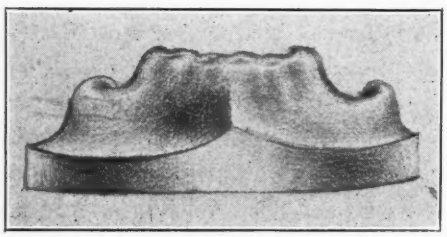

Fig. 3.—The usual appearance of a mandible after an extraction of the teeth in a case similar to that shown in Fig. 2. Note the marked prominence in the anterior portion and the extensive resorption posteriorly. A construction of a satisfactory prosthetic restoration is almost impossible in such a case. Much better results are obtained if the prominent process is resected. Compare with Fig. 8.

left side. Two more incisions are made along each ridge starting at the horizontal incisions and running posteriorly along the ridge for about a half inch.

Using a raspatory the flaps are reflected (Fig. 4) and held out by a tissue retractor. Thus the bone becomes exposed to view (see Fig. 5). The next step is the separation of the specimen from the underlying and surrounding structures. This can be accomplished with facility by means of a small cutting disc. To prevent generation of heat the cutting disc is kept moist by means of a little ear syringe upon which intermittent pressure is exerted (Fig. 6). After the roots of the teeth have been cut across together with the labial and lingual bone, the cortical bone posterior to the canines are cut through

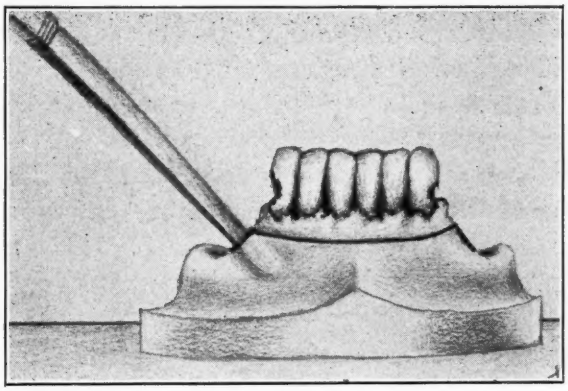

Fig. 4.—This figure shows the initial incisions made in the labial mucosa; the two other incisions are made along the ridge, then a raspatory is inserted underneath the mucoperiosteum to separate the flap from the underlying alveolar bone. A similar incision is made lingually and that flap is likewise reflected. See Fig. 6.

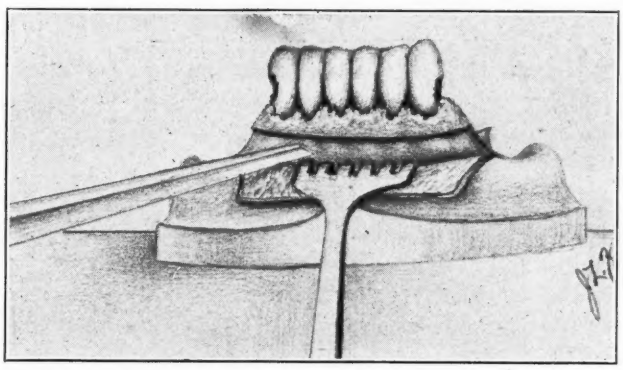

Fig. 5.—Model showing the labial mucoperiosteal flap retracted, exposing the underlying bone. The chisel is applied ready to cut through the dense cortical bone.

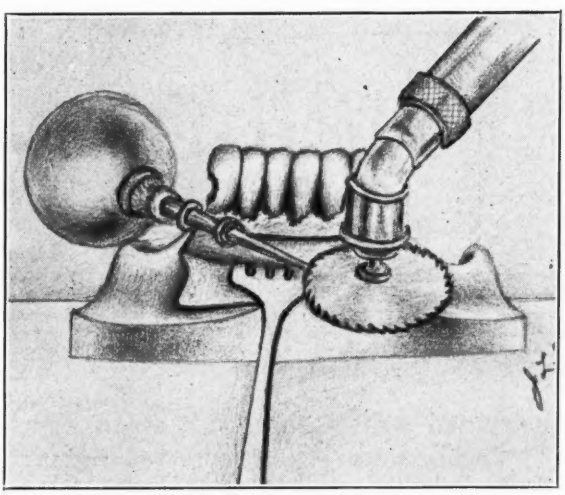

Fig. 6.—Drawing of a model representing the appearance of the teeth and part of the mandible before the specimen is separated from the bone. The labial flap is held out with a tissue retractor. A cutting disc (circular saw) is applied to the bone ready to cut it through together with the roots of the teeth and the lingual alveolar process. The rubber ball syringe is used for keeping the cutting disc cool.

with a chisel. The specimen is then separated (Figs. 7 and 9) and immediately placed in a receptacle containing a sufficient amount of 10 per cent formalin to keep it completely submerged. Those apices which remain in the sockets after the removal of the specimen are taken out with elevators. The rough edges of the alveolar process are evened out with bone files (Fig. 7), then flushed with warm saline to remove the débris, after which the flaps are coaptated and sutured. After five days the sutures are removed. During this

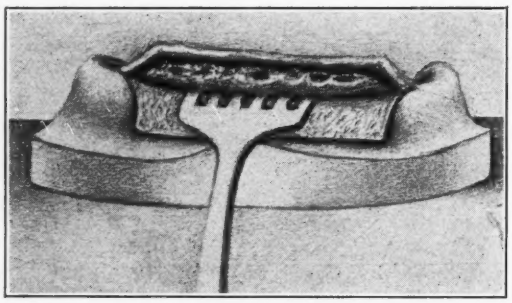

Fig. 7.—Appearance of the bone after the specimen (Fig. 9) had been removed. The edges are smoothed out, the flaps are trimmed, coaptated and sutured. Note that the relation of the flaps to the bone is exaggerated. All that is necessary is merely to approximate the flaps; there must be no overlapping.

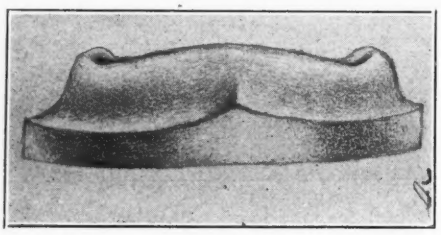

Fig. 8.—Appearance of the mouth after the operation is complete. Compare with Figs. 2 and 3.

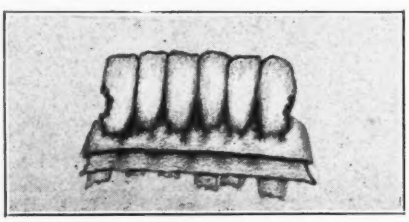

Fig. 9.—Drawing of a model reproducing the specimen removed from the mandible shown in Figs. 2, 3 and 8. Some of the roots were not cut through entirely, others not at all and came out together with the rest of the specimen which was removed with considerable force. *Great care should be exercised to avoid this.* The appearance of the roots is exaggerated here. They are cut flush with the bone and would ordinarily not be seen in such view if correctly reproduced.

period patient is instructed to keep the mouth clean, rinsing it with an antiseptic mouth wash. Within two weeks after the operation, the mouth is ready for reception of a denture (compare Fig. 8 with Fig. 3).

PRESERVATION OF SPECIMENS

After the work on the patient is completed, attention is then given to the specimen. If it is large and frail, containing more than three teeth, I have

found it an advantage to tie it with a thread; this serves three purposes. First, it is easy to handle, i.e., remove or replace in the receptacle; second, it helps to hold the specimen together, and third, it is convenient to attach to it a label for identification.

The specimen should be placed and kept in a glass jar filled with 10 per cent solution of formaldehyde.

It is desirable to have a photograph and radiogram of the specimen, which is quite a simple task. It is very important not to ruin the specimen by allowing it to dry up; therefore while the specimen is being roentgenographed or photographed it must be kept moist by touching it with a piece of cotton, saturated with the formalin.

Fig. 10.—Photograph of specimens consisting of three and four teeth removed together with their adjacent structures by the method herein described.

SUMMARY

There are six classes of patients who may serve as sources of material for histopathologic investigations of periodontal conditions. From such patients, specimens could be secured containing teeth with all adjacent structures in their normal relationship. Removal of such specimens can be easily accomplished by the use of a circular saw, chisel and scalpels. Such specimens offer excellent material for study. This method of obtaining valuable material for histologic investigation in addition greatly aids the prosthodontist by shaping the mouth as well as making it receptive of a prosthesis in a short time.

LOCAL ANESTHESIA*

By Ernest A. Morris, D.D.S., Houston, Texas

IN PRESENTING this subject, I feel that we can well quote, as a part of my paper, from one read by Dr. Howard C. Miller of Chicago at Philadelphia in 1926.†

"The use of local anesthesia in its various forms has successfully passed through the experimental stages and has reached its rightful place among accepted dental procedures. Many think of local anesthesia as a method of injecting the anesthetic solution into the surrounding tissues under considerable pressure. This has come to us from its early use, when pressure was considered essential to success, and no doubt is the cause of many tissue lesions and much discomfort to the patient, producing considerably more primary pain and markedly increasing secondary cellular reaction.

"Clinical experience has proved, without a doubt, that a solution injected slowly with only sufficient pressure to discharge it into the soft tissues along the mucobuccal fold, or into the deep tissues near the entrance or exit of the nerve trunk from its bony canal, will prevent many of the unfavorable sequelae that follow where the solution is infiltrated into the dense surrounding gum tissue.

"It is not uncommon to hear comparison of the so-called infiltration and the deep block methods, when, in reality, anesthesia is produced in both by the solution infiltrating the nerve structure. In one, the solution is injected into or around the operative field, and, in the other, at some distant point from the field of operation. Never in blocking branches of the fifth cranial nerve is an attempt made to pierce the nerve sheath. When this does happen, it is the cause, in some cases, of prolonged anesthesia and, in others, of severe postoperative pain.

"One of the greatest causes of technical failure is that the solution is not sufficiently near the nerve trunk for it to infiltrate the surrounding tissues and epineurium and to anesthetize completely the central nerve fibers.

"There are those who still claim that the interference of a local anesthetic with the circulation has a great deal to do with many of the violent reactions and exacerbations that are seen. These claims are probably made without a thorough knowledge of the fundamental principles of local anesthetics and without careful clinical observation of their results.

"There are others who believe that unnecessary pain and swelling are produced by the use of local anesthetics and that the blood clot in the tooth socket more often breaks down and disintegrates after three or four days.

*Read before the Texas Society of Exodontists and Oral Surgeons, Forth Worth, Texas, May 19, 1930.

†Published in the Journal of the American Dental Association, October, 1927.

"The question of postoperative pain varies in different individuals and is governed to a great extent, when due to the anesthetic, by the solution injected and the manner of injection. There is a period of absorption after the action of the vasoconstricting agent has passed away, which varies from forty-five minutes to one hour and a half, this depending on the amount in the solution injected. There is dilatation of the vessels and an increase in the blood supply to the part. This dilatation is due to the compensatory action of epinephrin, which always manifests itself in a hyperemia of the part after its use. This period lasts from two to five hours, during which the injected solution is completely absorbed, provided its action corresponds, as nearly as possible, to the physiologic action of the living tissue cells. While absorption is taking place, the patient may experience some discomfort and soreness due to the use of a local anesthetic, but if he has been sufficiently warned of the possibilities of this discomfort and proper directions have been given to combat it, he will minimize the discomfort and report back, in many cases, that no pain was experienced.

"The most common cause of swelling is the rupture of a small blood vessel by the insertion of the needle, which allows its contents to escape into the surrounding tissues. Too rapid injection, which may cause ballooning or distention of the tissues, also produces some swelling. Another cause is the use of a dull needle and careless manipulation of the syringe, all of which will traumatize the tissues unnecessarily.

"The question of disintegration of the blood clot or the production of the so-called dry socket is a difficult one. This is possible in cases in which a general anesthetic has been used, as well as with a local anesthetic.

"In order that the number of these disintegrations may be decreased, the operator should prevent, as far as possible, the entrance of the saliva into the socket or wound. After operation, the patient should not be allowed to rinse the mouth vigorously, but should be requested to bite on a small pack of gauze placed over the wound for approximately ten minutes. This permits coagulation to take place at the base of the socket without disturbance, preventing many of the postoperative discomforts that are commonly laid to local anesthetics. The patient is dismissed with instructions not to rinse the mouth vigorously for twelve hours. This procedure is particularly adapted to the lower jaw, where these complications are most prone to occur.

"The selection of the anesthetic to be employed in any case is most important and rests with each individual operator, depending on the physical condition of the patient, the type of operation and the personal choice of the one making the selection. There are operators who prefer a certain anesthetic, and who therefore condemn the use of any other, not only in their own hands but also in the hands of others. This is unjust to the method condemned; for the successful operator is the one who selects the anesthetic best adapted to the case, and the one from which the patient is to receive the greatest benefit.

"Strict adherence to asepsis is an important factor and must be adhered to throughout. There are many who give too little attention to the proper

care and sterilization of the syringes and needles, both before and during their use, are careless in the preparation of the solution and give no particular thought to the conditions surrounding the patient and to disinfecting the area of injection.

"The use of proper anesthetic solutions and their preparation is a step that surely deserves some special attention. Because many proprietary anesthetic solutions have been on the market for years, and the natural tendency is to select the easiest means of preparation, too little attention has been given the anesthetic solution. The ideal anesthetic solution is a freshly prepared procain (novocain) solution varying from 1 to 2 per cent, with the addition of a small amount of vasoconstricting agent, such as epinephrin (adrenalin) or the synthetic product, 'suprarenin.'

"Whenever referring to the anesthetic solution before patients, most operators speak of it as 'novocain,' in preference to 'procain,' some believing the two to be different in their composition. Procain is the term given to the compound which is made in America, and it is identical with novocain. The British term the same product anocain. This synthetic compound was formerly made in Germany, but under the provision of the Trading with the Enemy Act, the Federal Trade Commission took over the patent and issued licenses to American pharmaceutic concerns for its manufacture. The license issued makes it a condition that the product be called procain instead of novocain; also that the American-made product be identical with that formerly obtained from Germany. Therefore, the term procain should be employed in preference to novocain.

"The fact that procain must be combined with epinephrin for successful anesthesia has led many to believe that these drugs are the cause of the unfavorable general reactions that are seen in some cases immediately after injection. While all data up to the present time tend to contradict this opinion, the amount used should be the smallest necessary to meet all requirements. These drugs exert a powerful action on the circulatory apparatus in producing an increased blood pressure, and even when administered in a solution of 1:1,000,000 will produce a slight local ischemia. The solution employed in general surgery, in which large amounts of local anesthetic are injected at one time, is a 1:100,000. Large doses of epinephrin are contraindicated in patients suffering from high blood pressure, and in patients who have diabetes or some severe heart involvement.

"Stock solutions are objectionable as their stability depends on the addition of some antiseptic or preservative, which, when injected, acts unfavorably on the tissues. The objection to the use of stock solutions is to be found in the report of the special committee of the American Medical Association investigating the toxicity of local anesthetics, in which procain was also reported to be the safest local anesthetic when properly employed.

"Many operators rapidly inject a 2 per cent solution of procain with the patient in an upright position and with no regard for age or physical condition. This, especially in patients past middle life who are in a state of low-

ered vitality, results in their feeling faint, with a rapid pulse, fullness in the chest and head and a distinct tremor. All of which can be avoided by the use of a weaker solution and slower injection, and always with the patient in a horizontal or semihorizontal position. This position is desirable in all cases when injection is being made, regardless of age and condition.

"Some patients may experience a peculiar sensation over the entire body, especially in the extremities, following the injection of a local anesthetic. The face may blanch and break out in a cold clammy perspiration, the pulse becoming rapid, the expression strained and worried; all of which symptoms are the result of a disturbance in the vasomotor centers either from fear or from the injection of the solution.

"The apprehensive patient should be reassured and his confidence gained through the attitude and ease of the operator and assistants. Some explanation should be made of what the patient is to experience, such as the sting of the needle and the tingling and numbness of the part; any explanation that seems adaptable to the patient to be operated on, this varying in all cases.

"The attitude of the operator will do much to relieve the patient's mental disturbance, which causes many of the nervous symptoms that follow the injection of a local anesthetic and are blamed on the injected solution.

"Patients who have had teeth removed previously under nitrous oxid-oxygen or have ever taken a general anesthetic believe that all anesthetics should be administered when the stomach is empty; consequently, many patients come into the office without having eaten for several hours. Contrary to this belief, patients should be advised to eat as usual, as syncope is less apt to follow in a patient who has eaten than in one who has not.

"The fundamental basis of local anesthetics is a thorough knowledge of the anatomy of the parts involved, followed by a definite technic.

"Local anesthetics come to us with a rich inheritance of usefulness and success, not only in dental surgery but also in the field of general surgery, where they have been employed for years by men who are skillful and who believe that many cases are better handled under local than under general anesthesia.

"The successful use of local anesthetics involves the careful application of its fundamental principles in every case in which it is employed; and as its basis, diagnosis, scrupulous asepsis, proper anesthetic solutions, a knowledge of anatomy and an exact technic are essential."

One of the greatest clinics in the world, The Mayo Clinic, Rochester, Minnesota, has proved to the satisfaction of the great majority of the dentists in the United States and abroad that local anesthesia is the anesthesia of choice in practically all dental cases, general anesthesia being used from choice in a very small percentage of cases. This is a very significant fact emanating as it does from a clinic which has at its disposal every facility at instant command so that the operators may use any anesthetic agent at will. They are not influenced by local public opinion, commercialism, business-getting methods, etc. The only consideration is securing for the patient that which is absolutely the best for the work at hand.

I have found that, all factors considered, fully 95 per cent of patients can have operation performed under local anesthesia with a greater margin of safety, and that the result is without doubt more satisfactory. It is my observation that those operators who do alveolotomies, remove impactions, operate cysts, etc., under nitrous oxide oxygen in their offices do not obtain as uniformly good results as those who are skilled in the use of and who use local anesthetics for the same operations. This does not apply to those operators who have hospital facilities in their offices to carry out proper preoperative and postoperative medication and care. Such procedure is equivalent to hospitalization of the case. Few men can afford to use their offices as hospitals, and those who have hospital facilities are most fortunate. Under such conditions almost any mouth surgery can be done as well under a general as under a local anesthetic. I believe that no case requiring fifteen minutes or more general anesthesia should ever be operated in any office by any operator, no matter how skilled, unless he has those facilities referred to, or is willing temporarily to create them for the benefit of his patient. Accidents occur even under most favorable conditions, and a doctor could well fear a jury's verdict if one happened where conditions did not warrant the procedure employed. I wish to make a plea that the general practitioner use general anesthetics less in his office except for the most simple operations.

Some of you may think that I am in a measure opposed to the frequent use of general anesthetics. I wish to state that under proper management, I am not. But certainly their use is not indicated in the majority of cases, and in those offices that are not properly equipped to handle them to the best advantage, local anesthetics should be used in most cases.

Extensive surgery under general anesthesia should be referred to the exodontist or oral surgeon who has the facilities for such procedure, and should be avoided by those not skilled in its use.

It has been my observation that the man skilled in the handling of patients under general anesthesia usually does not measure up to the same degree in handling patients under local anesthesia and vice versa.

One purpose of this paper is to secure for those who are interested in better and safer anesthetics, a means of fulfilling their every desire. It is up to us, as exodontists, to lead the way so that finally the demand will be so urgent that the manufacturers will produce in quantity a more desirable combination of procain and suprarenin so that it may be procured easily by the general practitioner in small quantities, just as he is now able to obtain other combinations.

For local anesthesia for dental and oral surgery, whether by infiltration or "nerve blocking" as regularly used by accepted methods, I have experienced for years the need of a more desirable anesthetic solution.

All manufacturers of tablets and solutions for dental use have two stock formulas. The novocain and the chlorides remain the same in each, the change in the suprarenin, or epinephrin content comprises the change of for-

mula. For example, one company produces a 2 per cent isotonic Ringer-Novocain tablet and calls that which contains 0.00002 gram to each tablet, a "T" tablet; and that which contains 0.00005 gram, an "E" tablet. Other companies compare the same proportions by calling them their "Special" and "Regular" solutions respectively, or "A" and "AA."

I am informed by one of the largest manufacturers of anesthetics for dental purposes that the "Regular" or "E" solution is used by the majority of dentists.

It is the demand for any product that determines the manufacturers' attitude toward it. It would be immaterial to them whether they manufacture this product with more or less suprarenin content. I am certain that they are always ready to cooperate in every way with the needs of the profession. This paper is written with the hope of stimulating interest in a dental anesthetic change which will prove very beneficial to the dentist and his patient.

It is my opinion that a solution containing 0.00005 gram suprarenin per c.c. of novocain is an unnecessarily dangerous agent in some cases. We never use this solution, nor do we even use the "Special" solution as manufactured, which is 0.00002 gram suprarenin per c.c.

As a dentist becomes experienced in his profession and appreciates the high degree to which his services and work are constantly raising discriminative standards, and as his work becomes a skilled art because of his own efforts and study, and his touch becomes a dexterous trained thing, then he will appreciate more a dental anesthetic solution that is safer than any which he can purchase today for immediate use, and one that is designed for dental and oral purposes so that delicate needs of each patient may be met fully.

Feeling the need of a better anesthetic solution, I listened with the greatest interest to Dr. Peyton R. Denman of Houston, for whose opinion and ability I have the greatest respect. He read a paper entitled "Toxicity of Novocain in Regional Anesthesia"*† to the dentists of Houston and reviewed his experiments with novocain in laboratory work, followed by the use of them in his large and successful surgical practice. Dr. Denman's paper is as follows:

"In searching the literature I am unable to find any satisfactory report upon the toxicity of the Alkamine Esters, therefore the purpose of the following investigation here reported, was to determine the toxicity of Novocain when administered subcutaneously for local anesthesia. The propriety of comparing the results of different investigators, studying different local anesthetics, by different methods, is at times questionable. Some of the other criteria for comparing and studying local anesthetic agents, pharmacologically, are purely arbitrary and are therefore not indirectly indicative of subcutaneous toxicity ratios.

*Published in Medical Record and Annals, February, 1925.
†Read before Harris County Medical Society, Dec. 5, 1925.

"EXPERIMENTAL PROCEDURE

"The rabbits used in this investigation were bought on the open market from dealers in Houston, Texas. No attempt was made to segregate the animals according to weight, color or sex. All the animals used weighed over one pound, eight ounces—the average about three pounds. Upon receipt in the laboratory all rabbits were weighed, tagged and placed in hutches. They were fed carrots and raw lettuce, and kept under close observation for twenty-four hours to make sure that they were in good condition.

"The rabbits were weighed on the morning of experiment and injections made into the abdominal muscles, beginning with minute doses, gradually increasing.

ADMINISTRATION

	MG. OF NOVOCAIN AMT. MG. PER KILO				
RABBIT	WT. IN GM.	GIVEN	BODY WT.	SYMPTOMS	
1	2470—13.6	32.4	13.1—.06	None	
2	1820—13.6	64.8	35.6—.02	None	
3	2100—13.6	97.2	46.2—.03	None	
4	965—13.6	130.0	132.0—.01	None	
5	1360—13.6	194.0	143.0—.01	None	
6	1480—13.6	259.0	176.0—.02	Mild, toxic	(6)
7	1870—13.6	324.0	173.0—.01	Mild, toxic	(7)
8	2040—13.6	389.0	190.0—.01	Mild, toxic	(8)
9	2270—13.6	545.0	200.0—.01	Mild, toxic	(9)
10	2270—13.6	518.0	228.0—.01	Mild, toxic	(10)
11	1020—13.6	380.0	381.0—.04	Severe, toxic	(11)
12	1130—13.6	518.0	456.0—.05	Severe, toxic	(12)
13	681—13.6	518.0	760.0—.15	Died	(13)
14	681—13.6	648.0	952.0—.19	Died	(14)
15	1930—13.6	308.0	160.0—.01	Given in 32 ccs. H_2O Slight drowsiness	(15)
16	1930—13.6	583.0	302.0—.02	Given in 60 ccs. H_2O Mild, toxic	(16)
17	1820—13.6	259.0	142.0—.01	None	(17)
18	908—13.6	162.0	178.0—.02	Mild, toxic	(18)

"Rabbit No. 6. Weight: 1480 gm. Was given 259 mg. of Novocain at 8:28 A.M. Symptoms: At 8:35 rabbit very quiet, sitting on haunches: increased respiration. 8:35 dropping both ears. Ears completely paralyzed. Respiration increasing. 8:40 tonic contractions of hind legs, body bent in half circle. 8:45 showing some relaxation, apparently conscious. 9:00 rabbit apparently normal, running around over floor, eating some carrots.

"Rabbit No. 7. Weight: 1870 gm. Was given 324 mg. of Novocain at 8:33 A.M. Symptoms: 8:40 very restless and respiration increased, apparently conscious, showing air hunger. Very rapid respiration, sitting on haunches. Paralysis of both ears. Lying flat on belly, hind legs extended. 8:41 going into convulsions. Hard convulsions with tonic contractions of hind legs. Body bent forward. Powerful contractions of neck muscles, drawing head between shoulders. Extreme tonic contractions of hind legs, apparently conscious. 8:44 neck muscles showing some relaxation. 8:45 relaxation of muscles taking place. Neck muscles relaxing, left hind leg in steady tremor. 8:51 apparently returning to normal, trying to get up. Res-

piration still fast. 8:53 muscles relaxed. Body straightened out. 8:54 very quiet, apparently relaxed. Respiration less rapid. 9:15, quiet, making efforts to arise. 9:28, lying on side, body bent backwards, making no effort to rise, but apparently conscious. 10:04 still lying down, respiration somewhat slower, but still showing prostration. 10:23 on feet, but with no coordination of hind quarters. 11:00, on feet, has regained coordination of limbs, occasionally kicking out of hind legs and twitching of limbs. 11:30 on feet, appears normal, except increased respiration. At 2:05 normal, walking around and eating.

"Rabbit No. 8. Weight: 2040 gm. Was given 389 mg. of Novocain at 8:44 A.M. Symptoms: 8:51 A.M., increased respiration, very quiet, sitting on haunches, increased respiration. Paralysis of both ears. 8:53, stretched out, flat on belly. 8:55, on side. 8:58, going into convulsions. Very rapid respiration, neck muscles violently contracted, drawing head between shoulders. 9:10, still in convulsions, very rapid respiration, some effort to get up. In coordination of muscles in hind legs. 10:00, up on feet, rapid respiration. 10:30 apparently normal.

"Rabbit No. 9. Weight: 2270 gm. Was given 454 mg. of Novocain at 2:44 P.M. Symptoms: 2:56 rabbit very quiet, sitting on haunches. 2:58 paralysis of both ears. 3:00 flat on belly. 3:02, turned on side. 3:05 going into convulsions, respiration very rapid. 3:10 violent contraction of neck muscles, drawing head backward and between shoulders. Still having convulsions. 3:20, very quiet, rapid respiration. 3:30 some relaxation of neck muscles and occasional twitching or throwing out of hind legs. 3:40 making some effort to get up, muscles relaxed, incoordination. 4:00 up on feet, evidence of some prostration. 4:30, normal.

"Rabbit No. 10. Weight: 2270 gm. Was given 518 mg. of Novocain at 2:49 P.M. At 2:52 sitting on haunches, very quiet. 2:53, paralysis of both ears. 2:56 prone on belly, very rapid respiration, slight contraction of neck muscles. 3:42 convulsions developed, which were mild. 3:40 rabbit very quiet, increased respiration, still prone on floor. Convulsive movements of hind legs. 4:00 making some effort to arise. Loss of coordination. 4:30 up on feet, apparently normal. 4:40 normal.

"Rabbit No. 11. Weight: 1020 gm. Was given 389 mg. of Novocain at 3:25 P.M. Symptoms: 3:28, incoordination. 3:29 dropping of ears, increased respiration. 3:30 violent retraction of head and neck, prone on right side, very quiet, very rapid respiration. 3:40 complete prostration. 4:00, in deep coma, respiration light, very rapid. 5:00 returning to consciousness, incoordination of limbs. 5:30 conscious, but no control of limbs, respiration much improved. 6:00 has regained control of front legs, hind legs still paralyzed, making effort to arise. 6:30 on feet, but incoordination of hind quarters still present. 7:00 same as 6:30, only control of hind quarters slightly improved. 7:30 same as 7:00 P.M., coordination slightly improved. 8:00 same as 7:30, no improvement apparent. 8:30. No improvement.

"At 7:00 A.M., 9-26-25 rabbit on feet, moving about slowly. Still some incoordination of hind quarters. Muscles of legs and back seem to be stiff-

ened, slightly contracted, making movements slowly with apparent difficulty. By 10:00 A.M., rabbit normal.

"Rabbit No. 12. Weight: 1130 gm. Was given 518 mg. of Novocain at 3:45 P.M. Symptoms: 3:50 no symptoms apparent. 4:00 paralysis of the ears, lying down on belly, respiration very rapid. Turned on side, complete prostration. Respiration light and very rapid. 4:30 in coma, respiration light and very rapid. 5:30 aroused from coma and made an effort to arise. 5:45 trying to get on feet. 6:00 on feet, staggering around, no control of front or back legs. 6:15 walking about slowly, gait unsteady. 6:30 walking slowly, gait improved. 7:45 still some incoordination. 8:00 still trying to get about. 8:30 slight improvement, better control of limbs. 9-25-26 at 7:00 A.M., on feet, very slight incoordination of hind quarters, muscles of back and legs seem stiffened. Appears fully conscious. 7:30 some improvement. 9:00 normal.

"Rabbit No. 13. Weight: 681 gm. Was given 518 mg. of Novocain at 7:50 A.M. Symptoms: 7:53 paralysis of both ears and hind legs. 7:54 prone on belly. 7:55 on side. 7:56 motionless on floor, head and neck retracted, respiration very rapid. 8:00 passed into deep coma, with occasional twitching of legs and head. 8:05 same at 8:00. 8:09 dead, respiratory failure. No convulsions.

"Rabbit No. 14. Weight: 681 gm. Was given 648 mg. of Novocain at 7:54 A.M. Symptoms: 7:56½ appears sick, sitting on haunches, hind legs drawn under body. 7:57 stretched out on belly, violent contractions of muscles, throwing himself backwards and turning a complete somersault. Neck muscles violently contracted, respiration extremely rapid. 8:00 mild, tonic, respiration very rapid. 8:02 passed into deep coma with occasional twitching of legs and head. 8:03 respiratory failure, no convulsions.

"Rabbit No. 15. Weight: 1930 gm. Was given 308 mg. of Novocain at 10:52 A.M. Symptoms: 11:40 seems drowsy, but no other symptoms have developed. 11:45 no symptoms. 11:50 no symptoms. 12:10 no symptoms. 12:20 no symptoms, respiration normal. 12:30 hopping about, seems normal except that the hind legs may be slightly stiffened. 12:45 same as 12:30. 1:00 same as 12:30, not very active. 1:15 no change. 1:30 normal.

"Rabbit No. 16. Weight: 1930 gm. Was given 583 mg. of Novocain at 11:30 A.M. Symptoms: 11:39 paralysis of right ear, respiration slightly increased. 11:40 having slight convulsions. 11:45 down on right side, limbs stiff, occasional kicking of hind legs, respiration increased. 11:50 respiration very rapid, down on side, muscles contracted. 12:10 same as 11:50. 12:20 legs twitching, moving head from side to side, still prone on right side. 12:30 lying on side, legs still stiff and occasional kicking out. Moving of head stopped, respiration not so rapid. 12:45 lying on belly, trying to get on feet, incoordination of limbs, respiration nearer normal. 1:00 P.M., up on feet, trying to walk, incoordination of limbs. 1:15 hopping about, gait unsteady. 1:30 up, sitting on haunches, seems to be rapidly returning to normal, has an occasional twitching or nervous jerk of head. 2:00 normal.

"Rabbit No. 18. Weight: 908 gm. Was given 162 mg. of Novocain at 2.39 P.M. Symptoms: 2:42 drooping of ears. 2:45 some stiffness in hind

legs, on belly, respiration very rapid, slight twitching of body. 2:46 convulsions, falling on side, very rapid respiration. 2:53 muscles of neck contracted, drawing head back between shoulders, prone on side, respiration very rapid. 3:00 still prone on side, legs and body twitching. 3:20 trying to get on feet, some incoordination. 3:40 on feet, getting around slowly, still some incoordination. 4:00 rapidly returning to normal. 5:00 normal.

"Would like to call special attention to the uniformity of all symptoms—also the small margin between the non-toxic and toxic dose of Novocain, which, in this series of experiments, proved to be 2-17 of a grain.

"It appeared that these rabbits could take one grain of Novocain per pound without manifesting any symptoms.

"It is also important to note the large amount of Novocain required to produce death, it requiring 5 1-3 grains per pound to kill the rabbit.

"We also learn that as the toxic doses increased, the convulsions became lighter and fewer. It was noted that neither of the rabbits receiving the lethal dose had convulsions—appeared profoundly prostrated and rapidly went into deep coma.

"A series of rabbits were used to determine the effect of the addition of Adrenalin, if any, upon the toxicity. It was found that the addition of three minims of Adrenalin to the ounce of solution increased its toxicity 3-17 of a grain per pound, body weight. In other words, the solution containing Adrenalin produced toxic symptoms when given in amounts of 16-17 of a grain per pound, body weight.

"I also ran a series of rabbits to determine the effect, if any, of Morphine and Hyoscin. It was found that it did not in any way affect the toxicity of Novocain.

"It was also determined that slight ether narcosis was a specific in relieving the toxic symptoms. As soon as the rabbit inhaled a few whiffs of ether he became quiet, respiration much slower, and when held in this state for thirty to forty minutes, he would, when awakened from the ether anesthesia, get up in a normal condition.

"The tables of computing the toxicity of drugs states that we multiply the amount of Novocain given the animal per kilo, body weight, by seventy, which gives the amount that is considered safe for a man weighing 160 pounds.

"Maurice J. Lewi, medical consultant, H. A. Metz Laboratories, Incorporated, reports the detailed results of a test with Novocain, C92, are as follows:

"Killed none out of 5 rats at 600 mgm. per kilo body weight.

"Killed none out of 5 rats at 800 mgm. per kilo body weight.

"Killed none out of 5 rats at 1,000 mgm. per kilo body weight.

"Killed one out of 5 rats at 1,200 mgm. per kilo body weight.

"Killed four out of 5 rats at 1,600 mgm. per kilo body weight.

"The minimal lethal dose for Novocain, C92, by the above described method, is 1,200 mgm. per kilo body weight for the Albino rat. This rep-

resents a dose of 90 grams (3 ounces) Novocain powder for a man weighing 75 kilos (165 pounds) when injected subcutaneously as a 2 per cent solution.

"A quantitative comparison of the toxicity of the Alkamine Esters of Aromatic Acids used as local anesthetics contains the details of the intravenous method which we developed and adopted for the determination of the toxicity of Novocain. The minimal lethal dose of Novocain by this method is 50 milligrams per kilo body weight which represents a dose of 3.75 grams (58 grains) Novocain powder for a man weighing 75 kilos (165 pounds) when injected intravenously as a 2 per cent solution.

"For infiltration anesthesia in man Novocain may be freely injected if slowly done, in properly prepared solutions of 0.5 per cent to 1.0 per cent strength in almost unlimited quantities, provided care is taken not to inject the solution intravenously. Babcock has repeatedly used 500 c.c. of a 1 per cent Novocain solution in a single operation. Farr (Practical Local Anesthesia and Its Surgical Technic, pp. 38-39) has employed 45 grains (3 gm.) in 0.5 per cent solution without untoward symptoms, and Meeker (J. Pharmacology and Exper. Therap., Vol. 22, pp. 375-392) employed 500 c.c. in 0.5 solution without toxic manifestations.

"Charles W. Hooper and Elsa Becker, New York, report that butyn is the most toxic of the Alkamine Esters of the Aromatic Acids used as local anesthetics. The maximal tolerated dose is 7.5 milligrams and the lethal dose 10 milligrams. The maximal tolerated dose of Cocain as well as the minimal lethal dose is 12.5 milligrams. The maximal tolerated dose of Apothesine as well as the minimal lethal dose is 20 milligrams. The maximal tolerated dose of Novocain is 45 milligrams and the minimal lethal dose is 55 milligrams.

"During the past eighteen months I have been doing practically all of my operations under regional anesthesia and in many cases I have used as much as fifty grains of Novocain without the slightest toxic symptoms. Therefore, in the light of these experiments, and a clinical experience in something over three hundred cases, Novocain solution can be used in sufficient quantity to do any major operation, with perfect safety.

"There are many elements that must enter into the successful use of regional anesthesia. The specialist who administers local anesthesia for the surgeon must necessarily expect a larger percentage of failures than the surgeon anesthetist, for the reason that the delicate handling of tissues must be developed to the highest degree by the operator. The psychology of the surgeon, anesthetist and the patient must coordinate.

"It is also necessary that the operating room nurses receive special instruction in their work. No rattling of pans and instruments, no talking, except by the surgeon and anesthetist—the anesthetist entirely with the patient and the surgeon to his assistants and nurses.

"A new nomenclature for all instruments must be established and all nurses and assistants thoroughly acquainted with these new terms. For

instance, when desiring a knife, the surgeon should use a term similar to this: 'Bard-Parker,' etc.

"In doing major surgery with regional anesthesia, at present we have quite a large nomenclature, viz.: Spinal, caudal, trans-sacral, para-sacral, para-vertebral, nerve-block, intra-neural, splanchnic and infiltration. Any one, or more, of these various techniques must be combined to anesthetize properly the field of procedure, it depending entirely upon the region to be operated.

"Therefore, you can readily see that the first requirement of the local anesthetist is a thorough knowledge of the nervous system. He must go a little beyond the textbook knowledge of the system, and be able to visualize the entire ramification of the nerves in the region to be anesthetized.

"It is not my purpose in this thesis to go into the technique of any one of these divisions or operations. However, I would like to call to your attention the advantages of regional anesthesia—both to the surgeon and the patient. Complete relaxation of parts—especially in abdominal and pelvic surgery, it rarely being necessary to use packs in the abdominal cavity. The intestines are relaxed and flaccid, and will, by properly manipulating the operating table, fall away from the field of work.

"The patients are rational at all times.

"Shock is almost unheard of, even in the most grave procedures. Nausea, vomiting and gas pains are practically nil.

"The patients can take nourishment the same day of operation.

"The bowel and kidney functions are undisturbed.

"A sufficient number of cases have already been reported to give Regional Anesthesia a high place in the realm of anesthetic agents, and I believe the anesthetist and young surgeon of today should lose no time in thoroughly acquainting themselves with this method of anesthesia."

You can see from Dr. Denman's experiments and from those of others quoted by him, that the toxicity of novocain in quantities, as used by the dentist and oral surgeon, is practically nil. A favorite state board question has been: "Give the dosage of novocain." The question is inane. If the question stated the suprarenin content, and based the answer on that in conjunction with the physical condition of the patient, then it would be reasonable.

Thoma, in his first book, "Oral Anesthesia," pages 42-43, presented his views on the toxic effect of high percentages of suprarenin, and gave some cases where he reduced the solution to a minimum of suprarenin and obtained gratifying results. It is unfortunate that this has not had the general effect on the profession of demanding a superior anesthetic. I have talked with various outstanding men of the United States and they agree in this. If more of the best men in the profession will use this solution and advocate its use, it will not be long before all colleges will use it, and gradually the public will not have to suffer the ill effects of the solutions with a high suprarenin content.

Dr. Denman believed that dentists could employ a solution free from adrenalin or its synthetic equivalent and obtain perfect results. I certainly hoped that he was correct in this, and began a series of experiments at length on practical cases at every opportunity.

One per cent, 1½ per cent, and 2 per cent solutions of novocain alone were used, and these same solutions were used respectively plus suprarenin content to correspond to the following amounts per c.c. of each solution:

0.000005 gm. to 1 c.c. solution
0.00001 gm. to 1 c.c. solution
0.000015 gm. to 1 c.c. solution
0.00002 gm. to 1 c.c. solution

I hereby submit my final conclusion based on five years of the experimentation, including over six thousand mandibular injections of the selected formula, resting the entire decision on the clinical evidence found. For five years I have used nothing else, and it is the greatest help to me and the patient. The solution giving the most accurate results under any circumstances and conditions for dental surgery, in my opinion, is: a 2 per cent Novocain-Ringer solution to which is added 0.00001 gm. suprarenin to each c.c. (This solution is not intended for anything except dental surgery and oral surgery.)

It may be formulated as follows:

Novocain	0.02	gram per c.c.
Suprarenin	0.00001	gram per c.c.
Sodium Chloride	0.005	gram per cc..
Calcium Chloride	0.0004	gram per c.c.
Potassium Chloride	0.0002	gram per c.c.

That is, we have the usual formula with the reduction of the suprarenin to one-half of the "Special" solutions or the "T" tablets, and one-fifth of the "Regular" solutions or "E" tablets as manufactured. Until this solution is manufactured for the discriminating dentist, he can make his own at will. One way is as follows: a 5 c.c. ampule (Metz) containing a concentrated sterile solution of novocain with suprarenin, each ampule containing 1 gm. novocain and 0.00055 gm. suprarenin in the 5 c.c. is used adding 50 c.c. of a properly prepared Ringer solution. (Smaller ampules may be had.)

I was haping to prove that suprarenin could be entirely eliminated from dental work. It cannot be done. It is an easy matter to determine the reason for this. The general surgeon uses anesthetic solutions in large quantities in his operations. The dentist cannot use large quantities. His areas are too confined; he cannot have excessive ballooning of the tissues when making careful preparation of the alveolar ridge for prosthetic appliances.

The unnecessary discomfort produced by large quantities used in a mandibular block far more than overbalances any argument in its favor as a

dental anesthetic. The anesthetic time of novocain alone is uncertain when used in small amounts in dental block anesthesia, so that for such work as removing mandibular impacted third molars, extraction of mandibular teeth, and preparation of the alveolar ridge for plates, it could not be considered anything but a failure. The dentist who reports an occasional case as successful, cannot be depended upon. He will not tell you when he has found out his error as applied to continued use. We can only depend upon some one who has tried hundreds and thousands of such cases and has learned the percentage of failures. Dental surgery must be 100 per cent efficient and painless; we must have an anesthetic that can be relied upon under all conditions where a local anesthetic is indicated. The new formula that I have given has been used in my office both in block and infiltration cases (approximately 12,000 times), and we have not had any of the reactions so commonly seen when injecting the stock solutions which have a larger suprarenin content. We have had only three or four cases of fainting in five years. We use this solution for everything from the most simple infiltration case for a simple extraction to the removal of difficult impacted third molars. Anesthesia lasts from forty-five minutes to an hour and fifteen minutes working time. I made six mandibular injections on myself for cavity preparation for inlays at various times, and the operator, as well as I, was overjoyed at the effects of the anesthesia.

I have never tried to anesthetize the second division of the fifth nerve with novocain alone, so I am not in a position to discuss the merits of that block.

We have anesthetized many patients who have shown toxic symptoms, with a solution showing a greater suprarenin content than 0.00001 mg. to c.c. With the new solution there was no reaction. One Houston physician, who had seen ill effects from mandibular cases and who was bitterly antagonistic to the mandibular block under all circumstances, is today a convert to its use. I had occasion to extract a mandibular molar for him and insisted upon using my judgment as to anesthetic. It developed that his wife had postponed some necessary extractions, and he brought her down also in a few days. This is indicative of what happens day after day. Any intelligent dentist will not confound purely psychic reactions associated with novocain-suprarenin injection.

In the occasional operation in an exodontist's practice, where a bloodless field is imperative, it can be secured by the usual means, if the patient's condition warrants it.

I do not consider butyn a favorable anesthetic for dental uses. Some of our members may be able to report something of interest regarding it, but general surgeons are discarding it because of its toxicity and sloughing tendencies. I do not feel that we need to use any agent which does not have the unqualified endorsement of the leading physicians. To persist in using butyn after their experience with it, would be to invite criticism in the event of any untoward condition resulting from injecting it.

Borocaine (Ethocaine Borate) is being advocated by the Northwestern University, and it may prove to be a good local anesthetic agent.

While I do not advocate an indifference to new solutions, I would like to sound a note of warning. Use them with caution, study results, and compare faithfully with those anesthetics of proved value and safety.

ABSTRACT OF
CURRENT LITERATURE

NUTRITION AND PEDIATRICS

By Samuel Adams Cohen, M.D., New York City

It is the purpose of this Journal to review so far as possible the most important literature as it appears in English and foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Avitaminosis. I. Pathological Changes in Nursing and in Weaned Albino Rats Suffering From Vitamin B Deficiency. B. Sure, H. S. Thatcher and D. J. Walker. Arch. of Path. **11**: 3, 1931.

The dietary factor which McCollum and Kennedy in 1916 termed water-soluble B, and which was later generally recognized as vitamin B is composed of at least two distinct vitamins: one with antineuritic and growth-promoting property, generally referred to as the antiberiberi vitamin, or vitamin B, the other dietary factor of vitamin B complex is generally referred to as the anti-pellagric vitamin, because in addition to possessing growth-promoting properties as does the antiberiberi vitamin, it also functions in the prevention and cure of pellagra-like symptoms in the rat. This is for the present termed vitamin G.

As a result of their experiments on nursing young of albino rats suffering from uncomplicated vitamin B deficiency, these investigators observed that there is a marked reduction in the glycogen content of liver and atrophy of the spleen as well as hypoglycemia and anhydremia associated with hematopoietic disturbance.

Moreover, they also observed that vitamin B per se possesses the function of producing growth which they noted was unrelated to food intake.

Avitaminosis. II. Pathologic Changes in the Albino Rat Suffering From Vitamin G Deficiency. H. S. Thatcher, B. Sure, D. J. Walker. Arch. Path. **11**: 3, 1931.

These experts have already pointed out that the so-called vitamin G is merely one factor of the vitamin B complex, and they studied the effects on sixty-four animals who were fed on vitamin G deficiency diet.

With the exception of failure of continuous growth and loss of body weight, dermatitis was the symptom most frequently observed (42 per cent). Autopsy findings of these animals deprived of vitamin G usually showed, among other changes, ulceration of the skin, congestion of the intestines fatty infiltration of the liver, atrophy of spleen, and a relative increase in weight of the adrenals.

It is interesting to note that there was a marked seasonal variation in the occurrence of dermatitis in these experimental animals which were fed on a

deficient vitamin G. diet; that is, there was comparatively little or no evidence of determatitis during the months of September, 1929, to May, 1930, whereas on the same vitamin G deficient diet 75 per cent of the animals presented dermatitis during the warmer months from April to September, 1929.

Such observations in the experimental production of vitamin G deficiency in albino rats (which the authors state have been noted for the first time) seem to be in harmony with experiences in human pellagra. Because more data is needed, the authors are careful to emphasize that neither they nor other investigators actually produced a disease in the rat comparable with human pellagra.

From the point of view of oral pathology, it may be noted that these investigators state that stomatitis, one of the main symptoms reported by previous investigators, was not present in their experimental rats.

The Absorption and Excretion of Calcium and Phosphorus by Rats Receiving Excessive Doses of Irradiated Ergosterol. Elsie Watchorn. Brochemical J. **24**: 3, 1930.

Writing from the Brochemical Laboratory, Cambridge, England, the author mentions the fact that many investigators noted that excessive doses of irradiated ergosterol (Viosterol) to rats resulted in production of calcium deposits notably in the kidney and aorta, and in a tendency to hypercalcemia and hyperphosphatemia.

Although proof is difficult, this investigator believes that the calcium deposit must come from the bone and is not, as some believe, due to increased absorption from the intestine. Moreover, the writer observed that there was a slow recovery from the deleterious effects of excessive doses of irradiated ergosterol.

On the other hand, this English observer noted that there was less disturbance and quicker recovery to the metabolism of phosphorus which was disordered because of excessive intake of irradiated ergosterol.

The Influence of Vigantol on the Animal Body. R. Vara-Lopez. Klin. Wchnschr. **9**: 1930.

Vara-Lopez examined 21 guinea pigs and a number of mice after giving these experimental animals large doses of vigantol (the vitamin D solution). This writer noted that in the mice there was a rather marked deposition of calcium in the tissue, particularly of the kidney, heart, arteries, and musculatures.

In addition to marked loss of weight, the autopsy findings of the guinea pig for the most part showed definite changes in liver, spleen, kidney, and adrenals.

As a result of his investigations, Vara-Lopez believes that large doses of vigantol (vitamin D) are detrimental at least to such tissues as the spleen, kidney, and adrenals.

Observations of the Thymus. Walter Lester Carr. Arch. Pediat. **48**: 3, 1931.

Carr makes a timely contribution to the controversial topic of the thymus gland. Autopsy books of the many hospitals for infants and children show many variations in their considerations of thymus hypertrephia or thymus enlargement.

The author noted that from the statistics of the New York Eye and Ear Infirmary for twenty-four years only three deaths were recorded in children of five, seven, and nine years respectively in 31,163 operations for removal of tonsils and adenoids. While no postmortem reports were available, these deaths were held to be due to status lymphaticus, or as thymic deaths. In going over the records of some 7,560 deaths during 1929 which were investigated by the Medical Examiner's office, Carr found that 16 of these were of children under ten years of age. In the series of 16 deaths the anesthetic used in 10 operations was ether, and one of these had received roentgen therapy from June to October for enlargement of the thymus gland prior to operation.

In comparing these cases with the nonsurgical deaths such as, for example, injury, bronchopneumonia, Carr believes that "thymus deaths occur independent of an anesthetic and when the faulty constitutional condition has not been recognized," and he is of the opinion that an anesthesia properly administered by a competent anesthetist minimizes the danger from what is designated as thymus deaths.

This authority on diseases of children states that sudden deaths from enlarged thymus glands were reported centuries ago, and that there is a "systemic condition recognized both anti- and postmortem as status lymphaticus in children who have no increase in their x-ray shadow nor physical evidence of enlargement of the thymus."

Cod Liver Oil and the Vitamins in Relation to Bone Growth and Rickets. H. A. Harris. Am. J. M. Sc. **181**: 4, 1931.

In a masterly contribution Harris, who writes from the University College Hospital, Philadelphia, analyzes the story of the vitamins, particularly those which are found in cod liver oil, and their relation to bone growth and rickets. The first record in medical literature of the use of cod liver oil in England was for the treatment of rheumatism in the second half of the eighteenth century, and in 1771 the oil as a drug appeared in the British Pharmacopeia. In 1824 Schutte published the first reports of the curative action of oil in rickets, although it was not until 1841 that Bennet published his complete and comprehensive report on the action of oil in the treatment of rickets, which even today may be considered as a classic not only because of the writer's keen clinical evaluation of rickets, but also because of his appreciation of the value of the oil in the treatment of such eye conditions as xerophthalmia.

The author's reaction toward the abuses and exploitation of vitamins which have sprung up can best be stated by quoting the following: *"A balanced diet of good, fresh animal and vegetable food requires no addition of synthetic vitamins, as good wine needs no bush."* (Italics author's.)

Continuing, Harris states that the addition of synthetic vitamins to the diet may be justifiable only as a temporary palliative. Moreover, he feels that even by officially recognized organizations many animal experiments and clinical results are erroneously interpreted and attributed to the effects of certain vitamins. He emphasizes the fact that our present-day knowledge of the chemistry of bone, particularly the relation of calcium with phosphate and carbonate, is far from satisfactory. His remarks on bone changes in rickets are worth while repeating. He writes that "The proliferation of cartilage is excessive, the calcification of cartilage is defective, and the differentiation of true bone is imperfect. The three processes are in part controlled by water-soluble vitamin B, fat-soluble vitamin D and fat-soluble vitamin A respectively. The healing of rickets calls for a balance in all these processes with a balanced supply of all three vitamins. Neither can effect a cure in the absence of the others. Hence the pretensions of the adherents of one or other vitamin are inherently false, and cod liver oil alone gives a consistently cheap adequate and balanced supply of both the calcifying vitamin D and the differentiating vitamin A. This appears to be the legitimate explanation of the marked superiority of cod liver oil over any of the advertised substitutes."

The Treatment of Mitral Disease in Children. Thomas F. Cotton. Brit. M. J., 3663, 1931.

Cotton reviews his findings of the first 100 boys admitted for heart disease at the Edgar Lee Home at Willesden, England. The ages on admission were from eight to eleven years, and they were followed up for a period of seven or eight years. All had had rheumatism or chorea, and all but two had signs of rheumatic fever in the heart. Cotton regards pyrexia, pallor, loss of weight, nodules and a rapid pulse rate as signs that there is active rheumatic infection still present. According to him, arthritis, joint pains and other articular signs in a large number of cases played a minor part in the diagnosis of a recurring rheumatic infection.

In regard to treatment, salicylates were given a good trial, and except in those cases with high temperature were not found helpful. Moreover, digitalis when given in moderately large doses did not slow the pulse rate in those with persistent increased pulse rate.

The cases of organic heart disease divided themselves into three groups—one group of 57 with mitral disease with a mîtral systolic murmur, and another group of 23 boys had definite signs of mitral stenosis, and the smallest group of 14 boys had mitral stenosis and aortic regurgitation.

After a follow-up of almost eight years the mortality rate of the mitral stenosis group, either alone or combined with aortic disease, reached 57 per cent. Of the boys who had mitral stenosis alone the mortality was 65 per cent. The mortality rate of mitral disease with mitral systolic murmur was 29 per cent. The author is of the opinion that the mortality rate in these conditions could be lowered if satisfactory treatment in the form of good hygiene and adequate food were given in the early stages of rheumatic fever.

Acidosis From the Clinician's Point of View. Leonard Findlay. Brit. M. J., 3662, 1931.

Acidosis, which is merely an indication of some disorder of metabolism accompanying many diseased processes, is compared with fever in that acidosis per se is not a clinical entity. Testing for acidosis is like taking the temperature to help decide if there is any evidence of abnormal action of the tissue, and probably therefore of active disease.

Findlay emphasizes the fact that a true acid state of blood never occurs in life, and the circulation of free acid other than carbonic acid (CO_2) is incompatible with life; but what is understood as acidosis is the tendency to the production of such a state if matters in the blood reaction were allowed to go on uncontrolled.

Acid is always being produced in the body as the result of katabolic activity, but by neutralization and excretion its production remains within normal limits.

If the production of acid is excessive or pathologic in amount and there is inadequate neutralization or defective elimination, then the balance is disturbed and the state of acidosis follows.

The introduction into the system of an abnormal amount or excessive degree of acid usually results in a low CO_2 in blood content. As a consequence usually the respiratory center is stimulated to greater activity with the clinical picture of hyperpnea (excessive respiration).

Sometimes, however, there is a lowered CO_2 blood volume, not because of abnormal production of acids but because of forced respiration either voluntary or as a result of high altitudes. As a consequence of this hyperpnea (induced or otherwise) the tendency will be toward the production of the state of alkalosis. The fact that acetonuria, or acetone in the urine, may be present both in acidosis and in alkalosis "should give the death blow to the current opinion that the presence of acetonuria indicates acidosis." As a matter of fact acetone in the urine results from incomplete combustion of fats.

In a large measure the body protects itself from excessive accumulation of acid through the regulating mechanism of the excretory function of the lungs and kidneys, and the state of health of these important organs is the all-important factor of the progress and cumulative nature of acidosis.

On the Immunity of Foreign Races to Scarlet Fever. Otto Fischer. Munchen. med. Wchnschr. **77**: 41, 1930.

Because the Dick test was positive in 1.8 per cent of 376 natives in tropical Africa (Tanganyika), Fischer concludes that the natives there, that is the black race, are by no means absolutely immune to scarlet fever. The author, however, mentions the fact that scarlet fever is almost unknown in the tropics, and that when it breaks out among Europeans living there it is never followed by an epidemic among the black races.

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EDITORIAL

The Angle Orthodontist

THE *Angle Orthodontist,* Volume I, Number 1, under date of January, 1931, arrived at our office a few weeks ago. It is published quarterly by the Edward H. Angle Society of Orthodontia, 184 Joralemon Street, Brooklyn, N. Y. Such is the information which one gleans from looking at the cover page.

We notice in the table of contents that the Editorial Board consists of Dr. Frederick B. Noyes, Dr. R. H. W. Strang, and Mrs. Edward H. Angle. We also notice the following, "A magazine established by the coworkers of Edward H. Angle, in his memory . . . ."

No one can question the fine sentiments connected with the established magazine devoted to the memory of Edward Angle. No one denies the fact that Dr. Angle contributed much to the advancement of orthodontia in his early days. There are, however, a great many of his former students whose experience forces them to disagree with some of the ideas which he held in later years. We notice some of the causes of this disagreemnt can be very easily found by a careful perusal of some of the articles which are published in the first issue of the *Angle Orthodontist*. Some of these things we shall mention later.

We notice the following statement on page 38, "The *Angle Orthodontist* is published by the Edward H. Angle Society of Orthodontia as a medium to advance the science of orthodontia in the United States and for the promotion of research and observation in this field." Such a purpose must be commended. We welcome any journal that will work for such a purpose. As long as the *Angle Orthodontist* follows the above-mentioned ideals, we shall lend our support in every way possible. However, on page 39 under the Editorial Department, we see what we believe to be the true purpose of the establishment of the *Angle Orthodontist*. We read the following: "The hitherto unpublished address of Welcome appearing in this, the first number of this journal, was given by Dr. Angle to his 'youngest boys' at the First Annual National Meeting of the Edward H. Angle Society of Orthodontia in June, 1922.

"It seems a peculiarly fitting introductory to this magazine which goes forth today as his emissary charged, as from his own lips, with the upholding of his ideals and the continuous upbuilding of the profession to which he devoted his life and which he loved with all the ardor of his intense nature.

"The Address was given nearly nine years ago. Since that time much has developed in orthodontia, both of good and of ill. Of the good, two recent developments stand out sharply and significantly in the promise they give of the deliverance of orthodontia from its present humiliation and despair. They are, first, a law, enacted for the protection and control of the teaching and practice of orthodontia; second, a school, a department of a university, established exclusive and thorough education and training of the recruits to the practice of the profession.

"At this day and age of rapidly increasing knowledge and of widespread learning it is but in the nature of things that this great boon (in reality a single boon, for either of the two developments would be valueless, or nearly valueless, without the other) should come to orthodontia. And while there is as yet but a single law, and but a single school dedicated to the advancement of Angle orthodontia, these developments are the most important because fraught with the greatest possibilities for good, of any steps yet made in the history of the science."

It will be noted that the real purpose of the *Angle Orthodontist* is to carry forward Dr. Angle's ideas as held by him and some of his "youngest boys."

The object of the founders of the *Angle Orthodontist* is to have laws established for the protection and control of the teaching and practice of orthodontia. They point with pride to the passage of the laws of Arizona, which

laws we believe have been a disgrace to the State of Arizona and a direct insult to the dental profession.

The founders of the *Angle Orthodontist* seem to be inoculated with the idea that the practice of orthodontia should be limited to a chosen few who have followed a different course of instruction. They also point with pride to the fact that a school, a department of a university, has been established for the exclusive and thorough training of the recruits to the practice of the profession along restricted lines.

We already were aware of the fact that a certain educational institution had been selected as the school that was going to lead the dental profession out of the wilderness regarding the teaching and training of orthodontists. We, however, do not believe this school possesses the high ideals which the founders of the *Angle Orthodontist* believe it does. We are unable to understand how any science can be advanced when the educational institution limits its teaching to the use of some one appliance and the said appliance is manufactured by a commercial concern solely and primarily for the production of a profit. For any educational institution to say that only one appliance can be used and that all other types of appliances are wrong, is certainly not in keeping with the present idea of science.

It reminds us of the condition which existed a few years ago in the medical profession when we had what was called different schools of medicine. As the science of medicine developed along biologic lines, these different schools automatically went out of business, or all merged into one medical department.

The object of the *Angle Orthodontist* seems to be solely the advancing of a particular type of regulating appliance, and the passage of laws limiting the practice of orthodontia to a chosen few. We do not believe such a policy is for the best interests of orthodontia as a science.

We have called attention to the fact that the *Angle Orthodontist* seems to be established for the sole purpose of advancing a certain style of regulating appliance. This opinion is substantiated by the fact that only one paper on orthodontia appears in the *Angle Orthodontist*, and that is, "A Discussion of the Newest Angle Mechanism." This paper was presented by Dr. Brodie before the Eastern Association of Graduates of the Angle School of Orthodontia, at New York in 1929. This paper is a plea for the new mechanism and for rapid tooth movement. The only portion of this paper which is in keeping with modern orthodontic ideas is the following statement: "From the E. Arch mechanism has been taken an arch form or a basic and stable ideal, toward which we can work all through treatment." This one sentence is the only good part in the paper.

If the users of the ribbon arch and the new mechanism would go back to the principles of the Angle E. Arch, they would make a real advancement in orthodontic treatment. With the old E. Arch any tooth movement can be accomplished that can be accomplished by any other appliance, and in a great many cases it can be done better.

Dr. Brodie seems to think that the ribbon arch and new mechanism offer wonderful possibilities in regard to anchorage. His statement is probably

based upon the fact that he is unfamiliar with other types of appliances, because better anchorages can be secured with various other types of appliances than can be obtained with the ribbon arch and new mechanism.

We welcome the *Angle Orthodontist* to the field of orthodontic literature, but we regret that its founders seem to be working upon the mistaken idea that only one style of appliance can be used and that certain types of orthodontic education must have legal protection. This latter idea we are particularly opposed to because any educational plan that cannot stand without legal protection is certainly weak and faulty.

SAVOY HOTEL, LONDON, ENGLAND

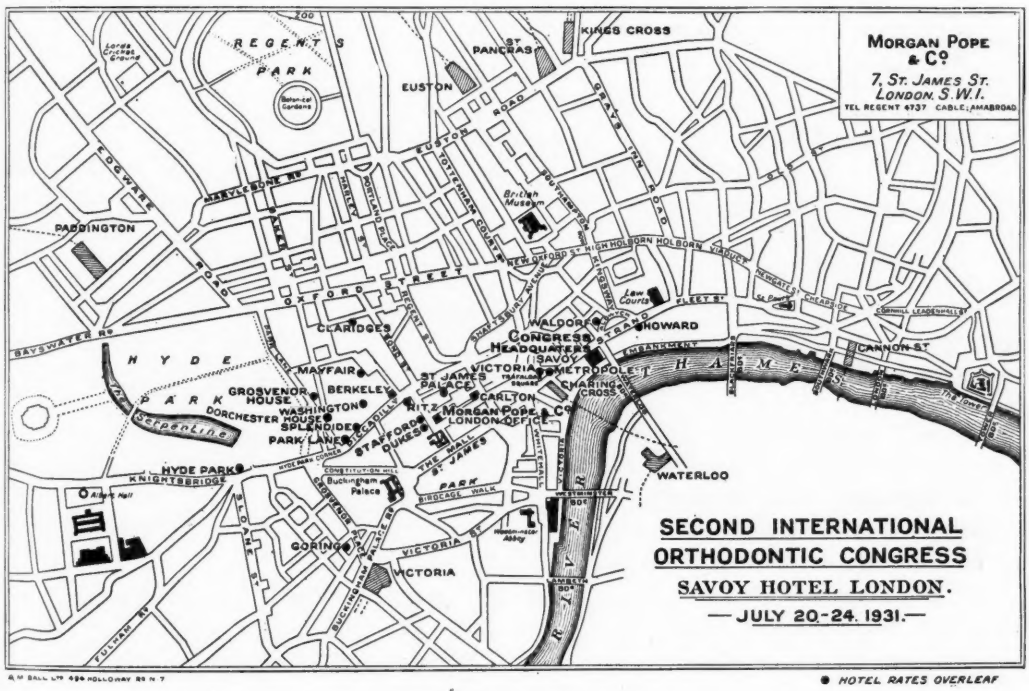
Headquarters of the Second International Orthodontic Congress

NEWS AND NOTES

Second International Orthodontic Congress

Savoy Hotel, London, W. C. 2

The Second International Orthodontic Congress will be held in London July 20 to 24, 1931. The headquarters will be the Savoy Hotel (and not the Hotel Great Central as previously announced).



● HOTEL RATES OVERLEAF

Provisional Program

JULY 20-24, 1931

(All meetings, unless otherwise stated, will be held in the Congress Suite at the Savoy Hotel)

MONDAY, JULY 20:

Morning	Registration.
	Opening of Congress.
Afternoon	Papers.
Evening	Reception at the Savoy Hotel.
	Popular Lecture by Professor Elliott Smith. "Evolutionary Tendencies Affecting Both the Teeth and the Jaws."
	Dancing.

TUESDAY, JULY 21:

Morning Papers.

Afternoon Demonstrations.

Evening Reception by the President and Council of the Royal College of Surgeons of England, at the College.

WEDNESDAY, JULY 22:

Morning Papers.

Afternoon Papers and Demonstrations.

Golf Tournament, Sunningdale Club (cars will start for Sunningdale about noon).

It is particularly requested that members who wish to compete in the Golf Tournament will send in their names and handicaps, as soon as possible, to the Chairman of the Golf Committee, Mr. T. A. Torrance, 4 Queen Anne Street, London, W. 1.

Evening Free.

THURSDAY, JULY 23:

Morning Papers.

Afternoon Demonstrations.

Evening Banquet at the Savoy Hotel.

FRIDAY, JULY 24:

Morning Papers.

Invitation Luncheon.

Afternoon Closing Meeting.

THE MUSEUM

It is hoped that the Museum will be representative of the best and most original work and material from Europe, America, and the British Dominions. It has been the endeavor of the Committee to make the Museum a special feature of the Congress, and it is felt that it alone will amply reward any member for attending the meeting.

The Museum will occupy a room 42 feet by 31 feet, and a selection of a few of the contributions already promised shows the comprehensive character of the specimens:

Models and skulls illustrating development and bone growth.

The growth of the alveolar bone and its relation to the movement of the teeth, illustrated by experiments on the jaws of madder-fed animals.

Various types of irregularities accompanied by models, also the different methods of treatment and appliances used.

Charts, diagrams and instruments, showing various methods of diagnosis.

Models and illustrations of abnormalities.

Photographs, case reports, radiographs, etc.

Letters setting out the conditions under which contributions to the proceedings are invited, together with copies of the Congress rules and application forms for membership, have been sent to all known to be interested in orthodontics, and the Secretary-General (Mr. B. Maxwell Stephens, 76 Grosvenor Street, London, W. 1, England) will be glad to send all such information to anyone applying for it.

Regular membership of the Congress (cost £ 2-2-0 per member) is limited to those who are members of organizations which are component societies of the Congress.

Subscribing membership (cost £ 2-2-0 per member) is open to all persons of repute

irrespective of society membership. Subscribing members have no right to vote or to hold office in the Congress.

J. H. BADCOCK, President,
B. MAXWELL STEPHENS, Secretary General.

Washington University School of Dentistry Announces Course in Exodontia

Starting Monday, June 8, 1931, Dr. George B. Winters of St. Louis, Mo., will conduct the annual summer course in Advanced Exodontia at Washington University School of Dentistry, St. Louis, Mo.

RUSSELL G. FOBES, Registrar,
Washington University, Dental Dept.,
4559 Scott Avenue,
St. Louis, Mo.

Washington University School of Dentistry Announces Course in Radiodontia

The week of June 15, 1931, Dr. Clarence O. Simpson, of St. Louis, will conduct a special course in Radiodontia at Washington University School of Dentistry, St. Louis, Mo.

RUSSELL G. FOBES, Registrar,
Washington University
School of Dentistry,
4559 Scott Avenue,
St. Louis, Mo.

Third International Congress of Radiology

The following questions will be discussed at the third International Congress of Radiology which will be held in Paris July 26 to 31, 1931:

(1) Radiologic Examination of the Mucosa of the Digestive Tube.

(2) Radiologic Examination of the Urinary Apparatus by Excretion of Opaque Substances.

(3) Preoperative and Postoperative Treatment of Cancer of the Breast by Radiation (Recurrency and Metastases Excepted).

(4) Radiotherapy of Inflammatory Diseases.

(5) Diathermic Electrotherapy of Inflammatory Diseases.

At a general meeting, all sections being present, a thirty minutes' lecture will be given on each of these subjects. All congress members are invited to give the results of their experience on these questions both by special communication and during general discussion.

TRAVELS IN FRANCE

Congress members will benefit by a reduction of 50 per cent on the fare to and from the Congress on the French railways.

After the Congress several tours at reduced prices will be organized to different parts of France, including visits to various thermal and mineral watering places.

Particulars on the above-mentioned reduced rates on railway fares and on the tours after the Congress will be forwarded from the offices of the Congress to members who have paid their dues.

All information concerning hotel prices for the stay in Paris will also be forwarded.

The subscription fee is 300 French francs for members and 50 French francs for persons belonging to the member's family.

The summaries of the communications, not more than four hundred typewritten words, in English, French, or German, must be sent in before April 1, 1931.

All correspondence is to be addressed to the Offices of the Third International Congress of Radiology, 122 Rue La Boötie, Paris 8ème, France.

R. LEDOUX-LEBARD, Secretary.

Visit the Eighth International Dental Congress in Paris, August, 1931

HYGIENE COMMISSION OF THE INTERNATIONAL DENTAL FEDERATION

This is an explanation of the aim and method of operation of the Hygiene Commission of the International Dental Federation (H.C., F.D.I.), for the dental profession.

The Hygiene Commission particularly covers the field of study of:

1. Mouth hygiene conditions in the various countries.
2. The influence of mouth and dental diseases on health conditions at large.
3. The means of improving mouth hygiene conditions.
   (a) By introduction and news of dental care, before, during, and after compulsory school age, for the purpose of improving mouth conditions.
   (b) By promoting dental care and mouth hygiene among the mass of the people (adults), that due to their social economic position are deprived of this benefit.
   (c) By inquiring how professional diseases of the teeth and mouth can be prevented.

The Hygiene Commission therefore approaches the national committees affiliated with the International Dental Federation for the purpose of collecting and getting acquainted with the most recent results of oral hygiene provisions and dental care as well as with the precautions in as many countries as possible.

The Hygiene Commission makes inquiries in many countries and is thus able, from the reports received, to spread information about oral hygiene and dental care. This information bears not only on installation, but also on the most economic application of the dental provisions for school children and adults (e.g., estimates of cost).

Furthermore, mention is made of the fact that during the annual session at Utrecht it was resolved that the Hygiene Commission should collect and widely disseminate means of enlightening the various nations about oral hygiene and dental care, so as to bring about appreciation of effective dental care as a necessity by the advancement and organization of annual exhibits.

In this way the Hygiene Commission promotes oral hygiene in all countries, organizes oral hygiene exhibitions on as many occasions as possible during the annual sessions of the International Dental Federation in the countries in which they are being held, for the instruction of the people, and in addition it tries to have these exhibits held in the countries affiliated with the International Dental Federation. The Hygiene Commission is endeavoring to make a permanent collection which is as complete as possible.

The Hygiene Commission considers it a duty to inquire scientifically and sociologically into the causes of diseases and the means for prevention or combating them.

There are the following three subcommissions:

1. The subcommission for dental care of children.
   (a) Infants.
   (b) School children.
   (c) Children past school age.
2. The subcommission for public dental care (adults).

3. **The subcommission for oral hygiene investigations and International Mouth Hygiene institute.**

These subcommissions are engaged in present-day problems of oral hygiene. The International Institute of Mouth Hygiene is affiliated with the Hygiene Commission.

The efforts of the Hygiene Commission of the International Dental Federation have already been successful. Under Professor Jessen's leadership the Hygiene Commission has been arousing interest in dental care in many countries.

The Hygiene Commission of the International Dental Federation has since 1925 entered into relations with the Hygiene Committee of the League of Nations through the intermediary of the Honorary President, Dr. N. M. Josephus Jitta, delegate of the Hygiene Committee of the League of Nations. This relation has been continued by a delegation from the Red Cross Commission. The Hygiene Committee of the League of Nations during the session of March 5-8, 1930, adopted the following resolution:

"The Health Committee, realizing the importance of maintaining efforts against dental diseases as vigorously as against other diseases, expresses its desire to be kept informed of the work of the International Dental Federation."

The Executive Council during the International Dental Federation's session at Brussels in 1930 charged the presidents of the Commission for External Relations (late Red Cross Commission) and of the Hygiene Commission of the International Dental Federation together to keep up those relations in the future.

We are confident that in this way governments of countries affiliated with the League of Nations will consider the aims of the Hygiene Commission of the International Dental Federation more than they have up to the present time.

VISCOUNT DE CASA AGUILAR, Chairman,
Madrid, Spain.

GEO. VILLAIN, Secretary,
Paris, France.

A.L.C.J. VON HASSELT, Treasurer,
The Hague, Netherlands.

American Society of Oral Surgeons and Exodontists

The thirteenth annual meeting of the American Society of Oral Surgeons and Exodontists will be held in Memphis, Tenn., October 16 and 17, 1931. The Elks Hotel will be the headquarters for the meeting.

HOWARD C. MILLER, Secretary,
55 E. Washington Street,
Chicago, Ill.

American Dental Assistants Association

The seventh annual meeting of the American Dental Assistants Association will be held in Memphis, Tenn., October 19 to 22, 1931.

RUTH F. ROGERS, President,
223 W. Jackson Blvd.,
Chicago, Ill.

Georgia State Dental Hygienist Association

The annual meeting of the Georgia State Dental Hygienist Association will be held June 10 and 11, 1931, at the Biltmore Hotel, Atlanta, Ga.

MRS. M. W. ALMAND, JR., President.
LOUISE HALL, Secretary.

Notes of Interest

Dr. Floyd E. Gibbin announces the opening of his offices in the Medical Centre Building, 333 Linwood Avenue, Buffalo, N. Y. Practice limited to orthodontia.

Dr. W. G. Foster announces the removal of his office to Medical Arts Building, James Street South at Young Street, Hamilton, Ontario, Canada. Practice limited to orthodontia.

Dr. Norman J. Whitehill announces the opening of an office at 1904 Pacific Avenue, Atlantic City, N. J., for the exclusive practice of orthodontia.